

A REVISION OF THE NEARCTIC EUCHARITINAE (HYMENOPTERA: CHALCIDOIDEA: EUCHARITIDAE)

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Abstract

Proc. ent. Soc. Ont. 116:61-103 (1985)

The species of the subfamily Eucharitinae (Eucharitidae) are revised and keys provided for the five genera and 16 described species of the Nearctic region. The taxonomic history of the Eucharitidae is briefly reviewed and the defining characters of the subfamilies Oraseminae and Eucharitinae are given. Five new species of *Pseudometagea* Ashmead are described: *barberi* (from Ontario), *hirsuta* (from California), *nefrens* (from lower Boreal), *occipitalis* (from central North America), and *rugosa* (from Mexico). The species *Stilbula montana* Ashmead is newly combined in *Pseudometagea*. The species within *Pseudometagea* are referred to three species groups. Redescriptions of species and keys are provided for the Nearctic species of *Kapala* Cameron and *Lophyrocera* Cameron. A key to the Nearctic species of *Pseudochalcura* Ashmead is included. A new genus, *Obeza*, is proposed for the New World species which were previously included in the Old World genus *Stilbula* Spinola and includes the following species which are all new combinations: *floridana* (Ashmead), *grenadensis* (Howard), *maculata* (Westwood), *meridionalis* (Kirby), *nigromaculata* (Cameron), *semifumipennis* (Girault) and *septentrionalis* (Brues). Phylogenetic relationships among genera and species are discussed briefly.

Introduction

The Eucharitidae is a morphologically diverse family within the Chalcidoidea. There are 44 genera presently recognized and more than 332 species distributed in every zoogeographic region of the world with the only notable exceptions being New Zealand, the polar regions and a few of the more isolated oceanic islands. The only available keys to genera are those provided by Ashmead (1904) and Schmiedeknecht (1909) which deal with only 25 and 26 genera, respectively. In the nearctic region, there are six genera and over 33 species distributed throughout, with at least one species extending as far as the northern tree limit in Canada and Alaska.

The Eucharitidae are treated in this paper as a separate family which is distinct from the Pteromalidae and closely related to the Perilampidae (Graham 1969, Bouček 1978). The Eucharitidae have been separated into two subfamilies (Burks 1979), the Oraseminae which is represented in the New World by the single widespread genus *Orasema* Cameron, and the Eucharitinae which is represented in the nearctic by five genera: *Pseudometagea* Ashmead, *Kapala* Cameron, *Obeza* n. gen., *Lophyrocera* Cameron and *Pseudochalcura* Ashmead.

Almost all of the World genera Eucharitidae are endemic. A few species of the genus *Orasema* are distributed in the Ethiopian, Oriental and Australasian regions, and one species of *Kapala* is found in the Ethiopian. Three species of *Eucharomorpha* Girault have been described from the Neotropics, with the genus being more commonly reported from Australia. I have not seen any representatives of this genus in the collections of Neotropical material to verify the records. There are no taxa at the generic level or below shared with the Palearctic. The New World genera appear to be closely related to the genera of Australasia.

Published information on the Nearctic Eucharitidae is limited mostly to sporadic distributional data and rearing records, and the only workable key to genera is by Ashmead (1904). The species of *Orasema* were dealt with by Gahan (1940), although this must be considered as only an initial treatment of a very diverse and widespread genus. The only revision of a New World genus of Eucharitinae was of *Pseudometagea* by Burks (1961).

Biology

As far as is known, the Eucharitidae include only genera which are specialized ant parasites (Wheeler and Wheeler 1937, Clausen 1941). Adult females oviposit away from the host into plant tissue, with eggs being either scattered on the leaf surface, laid into incisions on the leaf, or into developing flower buds (Clausen 1940). The number of eggs laid in a single oviposition ranges from one or two by *Orasema* to as many as ten thousand by females of *Stilbula manipurensis* Clausen (Clausen 1928, 1940). The range of plant hosts is fairly restricted and in one case, eggs were observed to be laid in association with the eggs of *Solenothrips rubrocinctus* (Giard) (Thripidae) (Clausen 1940). The eggs may remain stationary or can be dispersed on falling bud scales or even attached to the sides of wind-dispersed achenes (Clausen 1940).

Development may be immediate or the eggs may overwinter (Clausen 1940). The active first instar of the eucharitid, termed a planidium, moves by crawling or jumping and, if successful, is able to attach itself to an adult ant. It is then transported into the brood chamber of the ant nest where it relocates on an ant larva (Clausen 1940, 1941). The planidium remains attached to the ant larva as a quiescent first instar until the host pupates at which time the eucharitid consumes the host (Wheeler 1907, Clausen 1941). Eucharitids pupate and emerge within the ant nest.

Nomenclature

The nomenclature of the Eucharitidae is relatively stable for a group with 332 described species. The relatively few nomenclatural problems compared to other groups is probably due to the small number of workers who have studied the group, and the diverse and bizarre morphology which allows relatively easy separation of taxa. Most of the genera and species were described near the turn of the century by F. Walker, J.O. Westwood, W.H. Ashmead and A.A. Girault. Except for sporadic regional works, the family has been largely untouched over the past 80 years.

Eucharis Latreille (1802) was the first proposed generic name and was based on a Palaearctic species previously referred to as *Cynips adscendens* Fabricius (1787). Several genera were described after *Eucharis* and eventually combined to form the subfamily Eucharinae within the larger family Chalcididae (Ashmead 1897). Walker (1862) first recognized the group as a family and proposed the name Eucharidae. Foerster was the second author to recognize the group as a family level taxon in 1856 under the name Eucharoidae (Ashmead 1897). The family level status was not generally accepted until a more formal designation was made by Ashmead (1897) as the Eucharidae. In Dalla Torre's (1898) catalogue of species, the subfamily name Eucharidinae was used. The first usage of the name Eucharitinae appears to be by Girault (1928). Until the first catalogue of North American Hymenoptera established the family name Eucharitidae (Muesebeck *et al.* 1951), the name of the group used most often was Eucharidae or Eucharididae at either the family or subfamily level. *Eucharis* is a Greek noun for "pleasing" or "charming". The stem of the third declension noun is *Eucharito-* and is used to form the family name, Eucharitidae. The preferred name over the past thirty years has been Eucharitidae.

The first key available to the genera of Eucharitidae was Ashmead (1897) which dealt with 23 of the 42 genera now recognized. Ashmead's (1904) revised key included the genera *Pseudochalcura* and *Philomides* Haliday (= *Destefania* Dalla Torre in key). Five years later, a key was produced, in German, by Schmiedeknecht (1909) which was identical to that of Ashmead (1904) with the addition of one genus, *Stilbulaspis* Cameron. Since these world keys were produced, only a few regional keys have been provided (Ruschka 1924, Gemignani 1933, Gahan 1940, Bouček 1956, Hedqvist 1978).

I have adopted the more traditional treatment of the eucharitids as a distinct family (Graham 1969, Bouček 1978) and not as a subfamily within the Pteromalidae (Riek 1970). The exact morphological limits which define the family have not been fully resolved. However, the Eucharitidae can be generally defined by the reduced pronotum not visible

from above and not overlapping the mesoscutum medially, the falcate mandibles, the malar groove obliterated and the first tergite almost always covering the following segments. Another character, which is shared with the Chrysolampinae (Pteromalidae) and the Perilampidae, is the presence of a digitate labrum (Darling 1983). The above characters would exclude the Philomidinae which was included as a subfamily of Eucharitidae by Bouček (1978).

The Oraseminae (on a world basis) would be comprised of *Orasema* Cameron, *Losbanus* Ishii, *Psilogastrellus* Ghesquière (in part) and probably *Parasemora* Gemignani, whereas the Eucharitinae include all of the remaining genera. These subfamily concepts within the Eucharitidae are straight-forward within the Nearctic region but need to be reviewed on a world-wide basis. The Oraseminae are recognized by having a free prepectus not fused anteriorly to the pronotum, the male and female antennal flagellomeres cylindrical with an indistinct basal anellus, and the ovipositor expanded subapically and strongly ridged. The New World species of *Orasema* were revised and a key to 19 species provided by Gahan (1940). They are distributed throughout the United States and Mexico, with rare, northern records from Alberta, Manitoba, and Ontario. The ant hosts of *Orasema* have been reported as *Solenopsis* Westwood and *Pheidole* Westwood (Wheeler 1907, Wheeler and Wheeler 1937). Females of this genus oviposit into incisions made by their ovipositors in the leaf surface (Clausen 1940).

The Eucharitinae are a much more diverse group than the Oraseminae. Members of the Eucharitinae have the following characters in common: the prepectus fused anteriorly to the pronotum, the shape of the male and female antennal flagellomeres variable (cylindrical, serrate or ramose) and without a basal anellus, and the ovipositor usually long and acicular (may be laterally flattened and sword-shaped in some African genera such as *Mateucharis* Bouček and Watsam or thickened along the entire length and strongly ridged in some *Schizaspidia* Westwood). The ant hosts are known for only three of the Nearctic Eucharitinae: *Pseudometagea schwarzii* (Ashmead) from *Lasius* (Ayre 1962), *Pseudochalcura gibbosa* (Prov.) from *Camponotus* Mayr, and *Kapala floridana* (Ashmead) from *Pogonomyrmex* Mayr (Wheeler 1907). All of the known plant associations for Nearctic eucharitines are based on records of oviposition into the fruiting bodies of grasses, composites or other plants, but never into incisions in the leaf surface. The range of oviposition methods are much broader in eucharitines from other regions and the method of oviposition into leaf surface has been recorded in *Kapala terminalis* Ashmead (Clausen 1941) and *Schizaspidia foveatella* (Girault) (Ishii 1932).

The genera of Nearctic Eucharitinae can be divided into three distinct monophyletic groups. *Pseudometagea* forms one group endemic to North America with no apparent relationships to any Neotropical genera. The few species of *Kapala* which are found in the Gulf States are part of a large and diverse Neotropical element. Species of *Obeza*, *Lophyrocera* and *Pseudochalcura* are northern extensions of more diverse Neotropical genera, which form a monophyletic grouping, with *Obeza* the sister group of the other two. There are no genera shared with the Palearctic region and the closest relationships of the three groups appear to be with genera of the Australasian region.

Materials and Methods

Specimens of Eucharitidae were obtained from over 90 museums in North and South America, Europe, Japan, and Australia. The large amount of material accumulated allowed for an effective, although by no means complete, examination of the world genera of Eucharitidae and, in particular, the Neotropical species. Due to their generally large size and bizarre morphology, eucharitids tend to be accumulated in many collections where more "typical" chalcidoids would usually be ignored. This provided a fairly complete survey of the Nearctic Eucharitidae based on the holdings of both large and small collections.

Material referred to in the text was borrowed from the following institutions (curators' names appear last in parentheses): American Museum of Natural History, New York,

NY (AMNH) (M. Favreau); Academy of Natural Sciences of Philadelphia, Philadelphia, PA (ANSP) (D. Otte); University of Arizona, Tucson, AZ (ARZ) (F.G. Werner); British Museum of Natural History, London, England (BMNH) (J. Noyes); Biosystematics Research Institute, Ottawa, Ont. (BRI) (C. Yoshimoto); California Academy of Sciences, San Francisco, CA (CAS) (W. Pulawski); Carnegie Museum of Natural History, Pittsburgh PA (CMNH) (G.E. Wallace); Colorado State University, Fort Collins, CO (COR) (H.E. Evans); Cornell University, Ithaca, NY (COR) (L.L. Pechuman); Florida State Collection of Arthropods, Gainesville, FL (FLA) (H.V. Weems, Jr.); University of Georgia, Athens, GA (GEO) (C.L. Smith); University of Guelph, Guelph, Ont. (GUE) (S.A. Marshall); University of Idaho, Moscow, ID (IDA) (W.F. Barr); Iowa State University, Ames, IA (IOW) (R.E. Lewis); University of Kansas, Lawrence, KA (KAN) (G.W. Byers); Los Angeles County Museum of Natural History, Los Angeles, CA (LACM) (R.R. Snelling); Lyman Collection, McGill University, Montreal, Que. (LYM) (V.R. Vickery); Museum of Comparative Zoology, Cambridge, MA (MCZ) (A. Newton); Mississippi Entomological Museum, Mississippi State, MS (MISS) (R.L. Brown); Montana State University, Bozeman, MT (MON) (S. Rose); University of Michigan, Ann Arbor, MI (MMZ); Rutgers University, New Brunswick, NJ (RUT) (G.W. Wolfe); South West Research Station of the American Museum of Natural History, Portal, AZ (SWRS) (V. Roth); University of California, Berkeley, CA (UCB) (L.E. Caltagirone); University of California, Davis, CA (UCD) (R.O. Schuster); University of Michigan, Ann Arbor, MI (UMI) (T.E. Moore); University of Minnesota, St. Paul, MN (UMS) (P.J. Clausen); United States National Museum of Natural History, Washington, DC (USNM) (E.E. Grissell).

A detailed description of the methods of analysis, special terms and applications of the terms, and a review of the variation found in characters of the adults is given in Heraty (in press). The following methods supply only information which is of direct relevance to this paper.

Detailed measurements of various structures were based, where possible, on a representative sample of 10 males and 10 females over the geographic ranges of each species. Maximum and minimum values of each measurement are reported in an attempt to include most of the range of variation that would be encountered.

The descriptions are based on the total number of specimens examined for both previously described and newly described species. All type material was examined for all of the species dealt with unless otherwise stated. Deviations in the type material or from the material examined are discussed in the remarks section accompanying each description.

Terms used to describe adult morphology are based largely on Graham (1969) with some deviation to follow terms used by Snodgrass (1911), Bucher (1948) and Masner (1980). Mesosoma is used instead of thorax to include the propodeum or first abdominal segment as a part of the thorax (Masner 1980). The metasoma is composed of a petiole and gaster. Disc of the propodeum defines the central area of the propodeum bounded laterally by the spiracles. Postspiracular furrow refers to the longitudinal depression running from the spiracle to the coxal base between the propodeal disc and callus (or metapleuron). Genal bridge is a term used to describe the fusion or almost complete fusion of the genae (=postgenae) behind the mandibles (Figs. 69, 70). Some of the most commonly used terms are illustrated in Figures 1-5, and 12. Descriptive terms for sculptures follow Harris (1978) as closely as possible.

The symbol [?] refers to label information which could not be accurately read and [!] refers to a misspelling of a name in the literature.

Synopsis of Nearctic Eucharitinae

Pseudometagea
schwarzii group

barberi n.sp.
schwarzii (Ashmead)
bakeri Burks
hirsuta n.sp.

<i>occipitalis</i> group	<i>occipitalis</i> n.sp. <i>rugosa</i> n.sp.
<i>montana</i> group	<i>montana</i> (Ashmead) n. comb. <i>nefrens</i> n.sp.
<i>Kapala</i>	<i>floridana</i> (Ashmead) 3 spp. [unplaced]
<i>Obeza</i>	<i>floridana</i> (Ashmead) n. comb. <i>septentrionalis</i> (Brues) n. comb.
<i>Lophyrocera</i>	<i>apicalis</i> Ashmead
<i>Pseudochalcura</i>	<i>americana</i> (Howard) <i>gibbosa</i> (Prov.) <i>liburna</i> Heraty <i>sculpturata</i> Heraty

KEY TO THE GENERA OF EUCHARITIDAE OF NORTH AMERICA

1. Prepectus completely separated from pronotum and reaching tegula (Fig. 47); antenna with basal anellus (Fig. 47); body metallic; ovipositor scimitar-shaped (Fig. 48); first gastral sternite constricted basally by transverse crenulate furrow (Fig. 48) *Orasema* Cameron
- Prepectus fused with pronotum (Fig. 1); antenna without basal anellus (Fig. 5); body yellow to black, sometimes with metallic colouration on head and mesosoma; ovipositor acicular (Fig. 3); first gastral sternite smooth or striate, without median transverse furrow 2
2. Prepectus reaching tegula, sometimes distinguished from pronotum by shallow furrow (Figs. 1, 50, 52); occiput broadly concave; metepisternum distinct from propodeum (Figs. 51, 65); mesepimeron strongly, and almost completely, transversely striate (Fig. 50); axillae constricted medially (Fig. 4); male and female flagellomeres cylindrical *Pseudometagea* Ashmead
- Prepectus not reaching tegula (Figs. 24, 53) and without separating furrow; occiput flat; metepisternum indistinct; mesepimeron variously sculptured, at most weakly transverse-striate around femoral groove; axillae transverse, not constricted medially (Figs. 57, 58); male flagellum usually ramose (Figs. 26, 43) (cylindrical in *Obeza*) 3
3. Frenum produced posteriorly into two long apical spines as long as mesosoma (Fig. 24), and frenal groove absent dorsally (Fig. 57); genae widely separated behind mandibles; mesosoma greatly elevated above dorsal margin of head; spiracle recessed into dorsal margin of pronotum but not enclosed dorsally *Kapala* Cameron
- Frenum without processes or with pair of short blunt processes, frenal groove distinct (Fig. 38, 58); genae meeting behind mandibles (Figs. 69, 70), encircling reduced mouthparts; mesosoma globose; spiracle recessed into dorsal margin of pronotum and enclosed by the pronotum dorsally 4
4. Frenum rounded; propodeum without expanded processes between disc and spiracle; genae fused behind mandibles; female flagellum serrate to slightly lobate basally and male flagellum ramose basally *Pseudochalcura* Ashmead
- Frenum produced apically as two short blunt processes; propodeum with expanded processes between disc and spiracles (Fig. 38, prp); genae not completely fused behind mandibles (Figs. 69, 70); female flagellomeres lobate, and male flagellum cylindrical or with a ramus present on all flagellomeres 5
5. Body testaceous with brown to black patterns, head black or dark cyaneous (Fig. 30); male and female flagellomeres cylindrical; angle of genal bridge greater than 110° (Fig. 69) *Obeza* n. gen.

— Body and head black; female flagellomeres lobate (Fig. 37); male flagellum with a long flat ramus on each segment (Fig 43); angle of genal bridge sharp, about 90° (Fig. 70)
 *Lophyrocera* Ashmead

***Pseudometagea* Ashmead**

Pseudometagea Ashmead, 1897: 239 (in key, no species); Ashmead 1904: 267, 386; Burks 1961: 253-257 (key to species).

Type-species. *Metagea schwarzii* Ashmead, 1892: 356 [by subsequent designation].

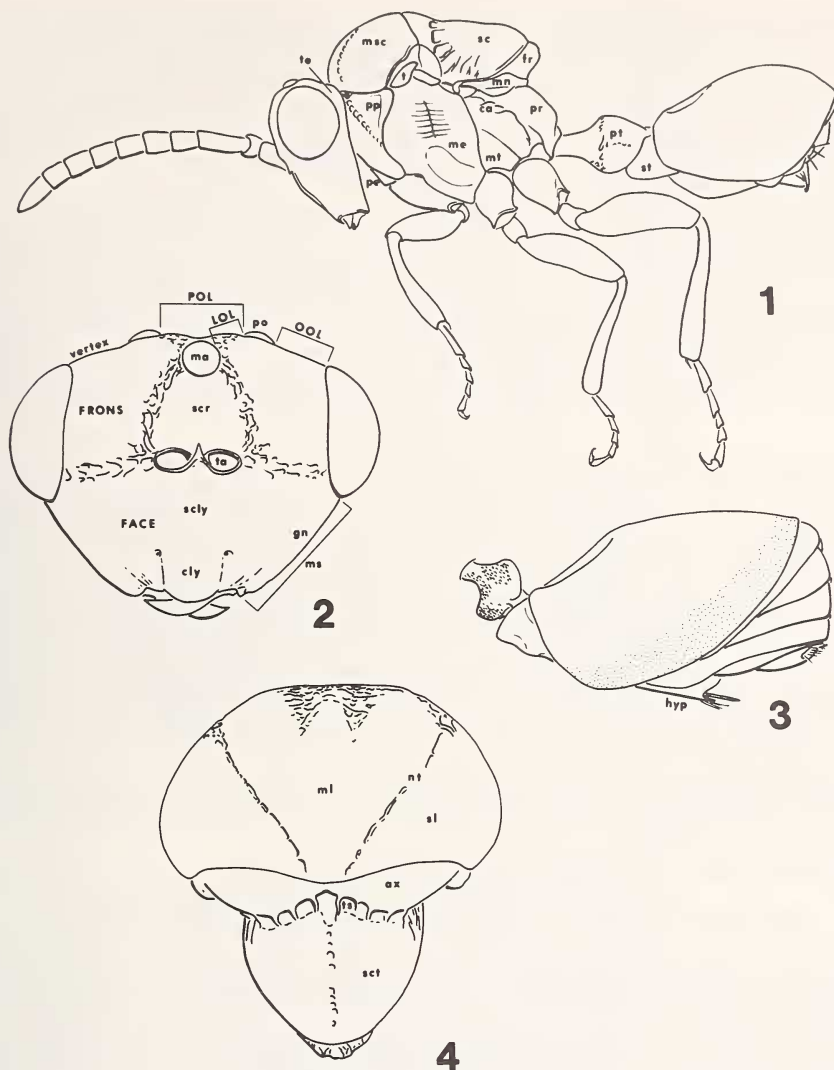
The genus *Pseudometagea* was originally described by Ashmead (1897) with *Metagea schwarzii* Ashmead being designated as the type-species (by monotypy) in Ashmead (1904). The two defining characters of the genus were the dorsally smooth mesosoma and the abruptly enlarged petiole. A second species, *Pseudometagea hillmedia* was described by Girault (1916) and later reduced to a synonym of *P. schwarzii* by Burks (1961). Burks (1961) described the genus in detail based on two species, *P. schwarzii* and *P. bakeri*. *Pseudometagea bakeri* has a rugulose mesoscutum and carinate scutellum which left only the enlarged petiole to define the genus. Burks (1961) supplied two further apomorphic characters: the depressed interocellar area and the (apparently) single metatibial spur.

The generic limits of the genus *Pseudometagea* are redefined and broadened to include two new species groups which are closely related but lack most or all of the above characters which were used to define this genus. Four species form the *schwarzii* group (*Pseudometagea*, *sensu* Ashmead and Burks) based largely on the interocellar depression (Fig. 75: 14), enlarged first sternite (:15) and expanded petiole (:17). From the Nearctic material gathered in this study, the known distributions of the previously described species are extended and two new species added based only on two isolated captures, *P. hirsuta* from California and *P. barberi* from Ontario. The *occipitalis* group is comprised of two new species, *P. rugosa* and *P. occipitalis*, which share only a few apomorphic characters (Fig. 75). The *montana* group includes *Pseudometagea montana* (Ashmead) n. comb., and a new species, *Pseudometagea nefrens*. The *montana* group is well defined on the basis of five apomorphies (Fig. 75).

There are several characters shared among the three groups, supporting their monophyly (Fig. 75). The complex is morphologically distinct from other New World genera and its closest relationships may be with some Australian genera such as *Tricoryna* Kirby or *Prometagea* Girault. It must suffice for the moment to say that *Pseudometagea* is monophyletic and does not share any close relationship with other New World genera.

The lack of a close sister group makes it difficult to determine the polarity of character states. The plesiomorphic character states shared by all of the *Pseudometagea* species groups (synapomorphies of the genus, characters 1-5) were recognized by comparing shared character states between *P. barberi* of the *schwarzii*-group, the *occipitalis*-group and the *montana*-group. I have interpreted *P. schwarzii*, *P. bakeri* and *P. hirsuta* to be the most apomorphic species within the genus since they possess the expanded petiole (18) and expanded first sternite (16), the median depression of the interocellar area (15), the bare eye (21) and a reduced number of flagellomeres in males (19). Two character states, the sculptured proepisternum (4b) and the absence of eye setae (5b), are considered as reversals within the genus and are found only in the most apotypic species of the *schwarzii*-group. The plesiomorphic state (4a, 5a) is apotypic for the genus in relation to other genera of Eucharitinae. The outer metatibial spur is greatly reduced but not absent, giving the appearance of a single metatibial spur and is a character state shared by the *schwarzii*- and *montana*-groups and *P. occipitalis*. A reduction in a character state is not considered as strong enough evidence of relationship between groups to aid in resolution of the proposed trichotomy and the character was not presented in the cladogram (Fig. 75).

Synapomorphies were not found which would determine evolutionary relationships between the three groups. Each species group could be recognized as a separate genus. This classification would be valid but yields two bitypic genera; an unnecessary splitting of taxa



FIGS. 1-4. *Pseudometagea schwarzii*: 1, habitus, ♂ ; 2, head, ♀ ; 3, metasoma (petiole + gaster), ♀ ; 4, dorsum of mesosoma, ♀ .

- | | | | | | |
|-----|------------------------|-----|--------------------------------|-----|---------------------|
| ax | - axilla | ms | - malar space | pt | - petiole |
| ca | - callus | msc | - mesoscutum | scl | - supraclypeal area |
| cly | - clypeus | mt | - metepisternum | scr | - scrobe |
| fr | - frenum | nt | - notaulix | sct | - scutellum |
| gn | - gena | OOL | - ocular ocellar line | sl | - side-lobe |
| hyp | - hypopygium | pe | - proepisternum | st | - first sternite |
| LOL | - lateral ocellar line | po | - posterior or lateral ocellus | t | - tegula |
| me | - mesepimeron | POL | - posterior ocellar line | te | - temple |
| ml | - mid-lobe | pp | - prepectus | to | - torulus |
| mn | - metanotum | pr | - propodeum | ts | - transcutal furrow |
| mo | - median ocellus | | | | |

for a small monophyletic group. To recognize the *schwarzii*-group as one genus, and the *occipitalis*- and *montana*-groups as a separate genus, based on shared plesiomorphic characters, could lead to a paraphyletic taxon if either group is more closely related to the *schwarzii*-group. The expansion of the generic limits of *Pseudometagea* to include the two new species groups appears to be the most prudent, since it recognizes the three groups appears to be the most prudent, since it recognizes the three groups as being monophyletic and leaves a workable number of species in the genus.

Generic Diagnosis. Head as broad as mesosoma, subtriangular in frontal view, 1.3 times broader than high (Fig. 2). Median ocellus anterior to lateral ocelli. Vertex rounded, without well defined occipital carina, occiput broadly rounded. Clypeus as long as wide and shorter than supraclypeal area. Mandible small, falcate; right mandible with three teeth, left mandible with two teeth (Fig. 20), apical tooth only slightly longer than width of oral fossa. Mouthparts well developed. Malar depression, if present, less than one-eighth malar space. Labrum usually 3 to 5-digitate, digits long (Fig. 20). Gena not produced posterior to mandible. Antenna without basal anellus, flagellomeres cylindrical in both sexes.

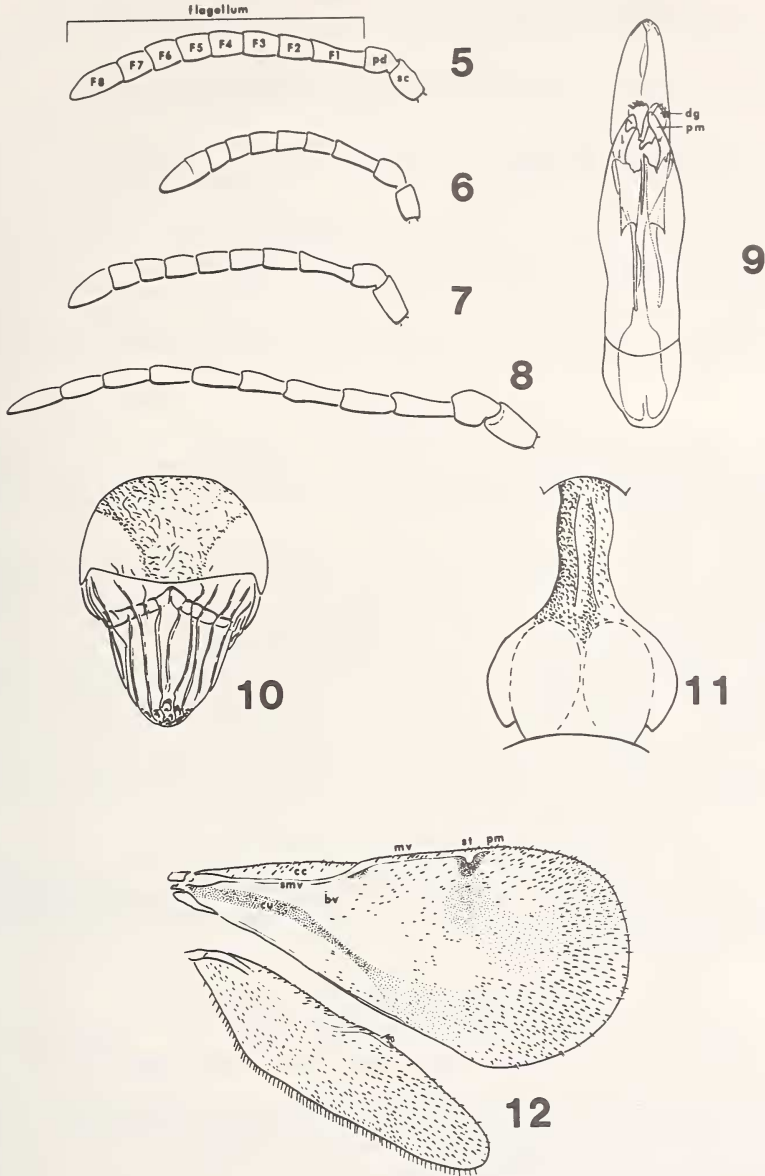
Mesosoma slightly longer than and as high as broad (Fig. 1), notaulices present or absent. Axillae fused and constricted medially, not transverse; joined to scutellum by crenulate transcuteal furrow. Scutellum usually half as wide as mesoscutum; frenum produced beyond apex of scutellum, truncate or emarginate. Propodeum rounded; metepisternum distinct, usually separated from rest of propodeum by shallow furrow dorsally and posteriorly. Mesepimeron longitudinally strigate, femoral groove central, shallow (Figs. 50, 52, 65, 66). Prepectus fused to pronotum, reaching tegula, posterior and dorsal edge glabrous; spiracle inset into dorsal margin, not enclosed dorsally. Coxae large and globose; mesocoxa without lateral carina. Legs stout; metatibia with two apical spurs, outer spur shorter, sometimes reduced and indistinguishable from apical setae. Costal cell 0.4 times length of forewing; wing veins usually distinct. Hindwing broadly rounded apically (Figs. 12, 21).

Petiole elongate (Fig. 49) or globose (Figs. 50, 51). Female gaster elongate, twice as long as high, hypopygium strongly produced (Figs. 3, 49). Male gaster rounded or elongate (Fig. 1). Ovipositor acicular.

Distribution. Nearctic. Figs. 71, 72.

KEY TO THE SPECIES OF *PSEUDOMETAGEA* ASHMEAD

1. Petiole strongly expanded apically, first gastral sternite constricted medially and strongly expanded basally (Figs. 1, 3, 50, 51); callus striate, usually forming a distinct ridge posteriorly (Fig. 65) *schwarzii* group 2
- Petiole only slightly expanded medially, first gastral sternite at most with slight basal constriction (Fig. 49); callus areolate-rugose, not strongly produced or forming a ridge posteriorly (Fig. 66) 5
2. Eyes setose; male antenna 12-segmented (Fig. 8) *P. barberi* n.sp.
- Eyes bare; male antenna 10-11-segmented 3
3. Scutellum smooth (Figs. 4, 54); proepisternum glabrous ... *P. schwarzii* (Ashmead)
- Scutellum longitudinally strigate (Fig. 55); proepisternum rugulose 4
4. Dense, erect hairs over dorsum of mesosoma; femora and tibiae with dense long setae *P. hirsuta* n.sp.
- Fine, short decumbent setae on mesosoma dorsally; femora and tibiae with sparse short setae *P. bakeri* Burks
5. Dorsum of mesosoma sparsely setose; metacoxa smooth; anterior margin of hindwing bare; one or two metatibial spurs clearly visible *occipitalis* group 6
- Dorsum of mesosoma densely setose; metacoxa granulate to rugulose; fringe of setae



FIGS. 5-12. *Pseudometagea*. 5-8, antenna: 5, *P. schwarzii*, ♀, larger size scale than others; 6, *P. bakeri*, ♀; 7, *P. hirsuta*, ♀; 8, *P. barberi*, ♂. 9, *P. schwarzii*, genitalia in ventral view, ♂. 10-11, *P. barberi*, ♂: 10, dorsum of mesosoma; 11, petiole, dorsal view. 12, *P. schwarzii*, fore and hind wings, ♀.

- | | | |
|--------------------------|------------------------|------------------------|
| bv - basal vein | mv - marginal vein | sc - scape |
| cc - costal cell | pd - pedicel | smv - submarginal vein |
| cu - cubital vein | pm - postmarginal vein | st - stigmal vein |
| F1-8 - flagellomeres 1-8 | | |

- around entire margin of hindwing; one metatibial spur apparent
 *montana* group7
6. Midlobe of mesoscutum mostly smooth; head and eye with sparse, long setae, dorsum of mesosoma with longer erect setae; forewing with short setae dorsally
 *P. occipitalis* n.sp.
- Midlobe of mesoscutum completely rugulose; head and mesosoma dorsum with short, appressed setae, eye with short, erect setae; forewing with microtrichia dorsally
 *P. rugosa* n.sp.
7. Scape long, reaching median ocellus; frenum emarginate at apex (Fig. 56); mandible well developed (Fig. 20); mouthparts not unusually developed; dense setae extensive over body and head (Figs. 49, 56) *P. montana* (Ashmead)
- Scape shorter, not reaching median ocellus; frenum truncate; mandible short, peg-like; mouthparts expanded (Fig. 19); dense setae restricted to dorsum of mesosoma
 *P. nefrens* n.sp.

P. schwarzii group

Group Diagnosis. Forewing hyaline; brown-infusate below stigma and along cubital vein, faintly infusate along basal vein and around apex of wing; wing rarely completely hyaline or completely infusate.

Interocellar space with prominent longitudinal depression from median ocellus to occiput; temple posterior to eye bulging (Figs. 1, 50); postoccipital carina present or absent; postgenal carina present. Lateral margin of clypeus poorly defined. Antennal scrobe narrow, as deep as width of scape, smooth. Scape short, only slightly longer than broad, only reaching halfway to median ocellus; antenna scabriculous.

Notaulices present, sometimes reduced posteriorly. Axilla variously sculptured, usually longitudinally striate along posterior margin only. Scutellum rounded, frenum rounded or truncate. Disc of propodeum areolate-rugose; callus longitudinally striate, interstices narrow, carinae joining posteriorly to form a sharp ridge usually extending to metacoxal base; metepisternum distinct, raised, usually not separated from propodeum by broad furrow. Proepisternum variously sculptured. Coxae sculptured. Metatibia with two apical spurs, outer spur indistinguishable from apical setae.

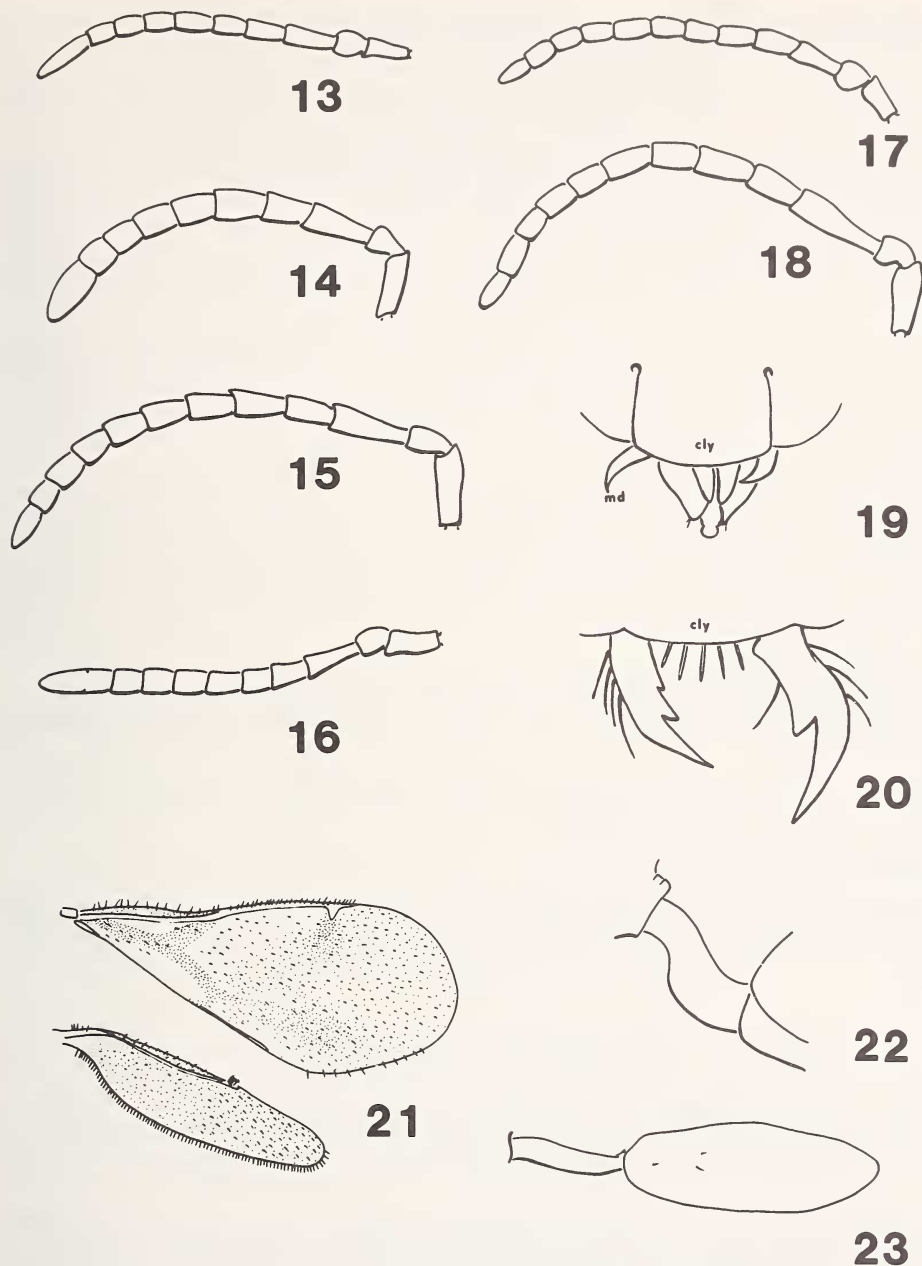
Petiole globose, appearing two-segmented, second segment formed by anterior projection of first gastral sternite (Fig. 51); petiole shorter than or equal to metacoxa in female, longer than or equal to metacoxa in male. Hypopygium of female with 6-10 long apical setae. Gaster rounded in male (Fig. 1).

Pseudometagea barberi new species

Figs. 8, 10, 11, 71

Male. Length 2.2 mm. Black; tegula, tibiae, tarsi and apices of femora dark testaceous.

Head slightly narrower than mesosoma, gena straight, temple slightly produced posterior to eye. POL 1.6 times LOL, POL 1.9 times OOL (see Fig. 2 for characters). Face not broadly rounded, slightly concave lateral to supraclypeal area, no transverse line of punctation from torulus to margin of eye; frons including scrobe, vertex, and gena laterally rugulose; weak occipital carina lateral to median depression, extending just past the lateral ocellus; occiput weakly transverse-striate; postoccipital carina absent; head including occiput dorsally covered by short erect setae; clypeus, supraclypeal area and eye with long, erect setae. Eyes separated by 1.8 times their height. Malar space equal to height of eye. Clypeus marked laterally and basally by weak lateral grooves. Mandible small. Labrum appearing 3-digitate. Antenna 12-segmented, tapered apically (Fig. 5); scape short, slightly longer than broad, reaching just over halfway to median ocellus; length of flagellum 1.6 times width of head, not thickening distally, first flagellomere 3.0 times as long as apical



FIGS. 13-23. *Pseudometagea*. 13-18, antenna: 13, *P. occipitalis*, ♀ ; 14, *P. rugosa*, ♀ ; 15, *P. montana*, ♀ ; 16, *P. nefrens*, ♀ ; 17, *P. occipitalis*, ♂ ; 18, *P. montana*, ♂ . 19-20, lower face in frontal view: 19, *P. nefrens*, ♀ ; 20, *P. montana*. 21, *P. occipitalis*, wings, ♀ . 22, *P. nefrens*, petiole in lateral view, ♀ . 23, *P. occipitalis*, male metasoma, lateral view. cly - clypeus, md -mandible.

width, following flagellomeres twice as long as broad; sensilla comprised of long and erect setae on scape, pedicel and basal flagellomere, decumbent on remaining.

Mesosoma dorsally with covering of fine erect setae; entire mid-lobe of mesoscutum rugulose, side-lobes smooth. Mesoscutum 2.4 times broader than long dorsally, notaulices indistinct (Fig. 10). Axilla shining, longitudinally striate, ridges continuing onto scutellum. Scutellum slightly longer than wide, rounded posteriorly, longitudinally striate, interstices wide, median depression lacking; frenum produced slightly beyond edge of scutellum, rounded, rugose. Disc of propodeum confused-areolate, interstices large, postspiracular furrow deep; callus with setae dorsally, not extending along ridge ventrally. Prepectus rugulose with shallow separating furrow, weakly carinate along posterior edge of furrow. Proepisternum weakly areolate. Coxae globose, finely alveolate, pro- and mesocoxae setose ventrally. Legs stout, with long inclinate setae; femora finely alveolate, tibiae and tarsi finely sculptured. Forewing twice as long as broad; both surfaces of costal cell with many long setae, dorsal and ventral surfaces of forewing disc covered by short setae, basal area with scattered setae dorsally; sparse fringe of setae around margin of wing except basal half of posterior margin; wing veins distinct; stigma large, almost twice as long as broad. Hindwing 4.0 times as long as broad, sparse fringe of hairs around entire wing margin.

Petiole 1.2 times as long as broad, more than 1.5 times longer than metacoxa, dorsal angle obtuse; anterior half narrow, cylindrical, and weakly sculptured dorsally, with dorsal longitudinal carinate groove, posterior half greatly expanded, flattened, bilobed dorsally, smooth and shining, expanded lateroventrally as lobes which extend out over the first gastral sternite (Fig. 11), broadly V-shaped ventrally to receive first gastral sternite. Gaster glabrous, as long as mesosoma.

Female. Unknown.

Type Material Examined. *Holotype* ♂, Pinery Pk., Grand Bend, Ont. [ONTARIO], 14 VII 1980, K.N. Barber. Deposited in BRI. Antennae broken at pedicel and mounted on point (by author).

Remarks. Although represented only by a single specimen, species status is justified by the possession of several unique features which place it well outside the variation encountered in the other species of *Pseudometagea*.

Distribution. Ontario. Fig. 71.

Etymology. This species is named in honour of K.N. Barber, Dept. of Environmental Biology, University of Guelph for his help in supplying me continually with both eucharitids and excellent collecting locations and also for being the first collector of this species.

***Pseudometagea schwarzii* (Ashmead)**

Figs. 1-5, 9, 12, 50, 51, 54, 59, 62, 65, 71

Metagea schwarzii Ashmead, 1892: 356.

Pseudometagea schwarzii; Ashmead 1900: 555; Ashmead 1904: 267, 386; Wheeler 1907: 12 (biology); Burks 1961: 255 (revision); Ayre 1962: 157-164 (biology).

Pseudometagea hillmedia Girault, 1916: 113.

Female. Length 2.0-2.3 mm. Brown to black; tibiae, tarsi and apices of femora testaceous. Gaster darker ventrally, occasionally all black.

Head subtriangular, gena broadly rounded (Figs. 2, 59, 62). POL 1.9-2.3 times LOL, POL 1.4-1.6 times OOL. Occiput with or without vague occipital carina lateral to median depression; face broadly rounded, transverse line of punctation from torulus to margin of eye extending dorsally around margin of scrobal cavity to anterior ocellus, rugosity sometimes more widespread; face and lateral areas of frons always smooth, dispersed-punctate with very short fine setae; posterior margin of gena rugose; occiput weakly areolate, postoccipital carina distinct (Fig. 62); eye bare. Eyes separated by 2.1-2.5 times

their height. Malar space 1.1-1.4 times height of eye. Labrum 4-digitate. Antenna 9 to 10-segmented, apical two flagellomeres sometimes fused (Fig. 5); scape short, only slightly longer than wide, weakly sculptured; flagellum slightly shorter than width of head, slightly thickened distally, first flagellomere 2.2 times as long as apical width, remaining flagellomeres subquadrate; sensilla comprised of dense, erect setae.

Dorsum of mesosoma smooth and shining, dispersed-micropunctate, completely bare (Fig. 59); rugosity of anterior vertical face of mesoscutum extending less than one third distance of mesoscutum. Mesoscutum 2.0-2.4 times broader than long dorsally, notaulices distinct, almost always complete (Figs. 4, 54). Axilla smooth, lacking carinae. Scutellum smooth, slightly longer than wide, rounded, with shallow median depression; frenum produced slightly beyond edge of scutellum, rounded, weakly crenulate dorsally, rugose laterally. Disc of propodeum areolate-rugose, interstices narrow (Fig. 65); postspiracular furrow pronounced, callus with setae dorsally, not extending ventrally along ridge; metepisternum longitudinally reticulate or foveate. Prepectus demarked from pronotum by oblique, areolate furrow with raised margins (Fig. 50), rugose to shallow-areolate. Proepisternum smooth. Coxae globose, finely alveolate to scabriculous, bare. Legs stout; femora scabriculous basally with sparse, appressed setae; metatibia and tarsi smooth, densely setose ventrally, sparse dorsally. Forewing 2.1-2.4 times as long as broad; costal cell with irregular row of long setae dorsally and ventrally; basal area bare, disc of wing covered dorsally and ventrally with dense setae or microtrichia, longer setae apically on dorsal surface; scattered setae around anterior margin of wing and restricted to apical third of posterior margin, may be present or absent; postmarginal vein 0.2 times length of marginal, stigma usually large, as long as broad, rarely long and narrow (Fig. 12). Hindwing 4.2 times as long as broad; scattered fringe of short setae along anterior margin, dense long setae along posterior margin.

Petiole 1.0-1.3 times as long as broad, 0.8-1.0 times as long as metacoxa; globose, dorsal angle acute, bilobed dorsally; anterior half rugulose-areolate, with shallow longitudinal depression dorsally, posterior half glabrous, flattened dorsally and laterally (Fig. 51), not concave ventrally. Gaster glabrous (Fig. 3).

Male. Length 1.6-2.2 mm. Colour pattern as in female but usually darker and gaster always uniform in colour. Malar space 1.0-1.3 times height of eye. Antenna 10 to 11-segmented (Fig. 1); flagellum longer than in female, length 1.2 times head width. Petiole 1.3-1.6 times as long as wide, 1.3-1.7 times as long as metacoxa; anterior narrow half cylindrical, longer than in female (Figs. 1, 50), equal in length to posterior expanded half, with vaguely margined dorsal longitudinal groove (as in Fig. 11); dorsal angle usually acute. Gaster short and rounded, bare; 0.7 times as long as mesosoma (Fig. 1). Genitalia large, digitus with 3-5 sensilla, paramere with 2-5 long setae (Fig. 9).

Type Material Examined. *Lectotype* of *Metagea schwarzii* Ashmead (♀) designated by Burks (1961) is "type 2140" (USNM) labelled "Washington, D.C., 30.6, *Metagea schwarzii*, ♀ Type". *Paratypes*: ♀, ♂ [?] Washington [DISTRICT OF COLUMBIA], (no. 2140 USNM); 2 ♀♀ Oakland [Maryland], June 10, 12 (no. 2140 USNM).

Holotype of *Pseudometagea hillmedia* Girault (♀) is "type 20319" labelled "♀". Collection data is "Glendale, Maryland, June 16 1916" taken from the original description. *Paratypes* are 2 specimens taken two weeks later [not seen].

Other Material Examined. 145 ♀♀ 256 ♂♂. **Alberta:** ♀ Medicine Hat, August [?] 14 1927, F.S. Carr (BRI); ♂ Scandia, July [?] 26 1956, O. Peck, swept from grass range (BRI); ♂ Oldman River, Lethbridge, June 22 1956, O. Peck (BRI). **Colorado:** ♂ Weld Co., Owl Creek, 12 mi NE Nunn, August 1977, H.E. Evans, Malaise (COL). **Delaware:** ♀ Milford, June 16 1964 (USNM); ♂ Milford, June 29 1964, swept beans (USNM). **Georgia:** 4 ♂♂ Pine Mt., 1 mi N., July 12 1957, W.R. Richards (BRI); ♂ Hiawassee, August 19 1957, L.A. Kelton (BRI). **Illinois:** ♀ Chicago, July 25, O. Bryant (MCZ). **Indiana:** ♀ Angola, June 7 1966, R. Lalonde & W. Boyle. **Iowa:** ♂ Sioux City, C.N. Ainslie (UMS); ♂ Sioux City, September 19 1919, C.N. Ainslie (USNM); ♂ South Ravine, Sioux City, August 6 1929 C.N. Ainslie, swept mixed veg (USNM); ♂ Sioux City, C.N. Ainslie, swept from alfalfa (USNM); ♀ 1 mi S Amana, June 23 1928, G.O. Hindrickson (IOW); ♀ 3 ♂♂ Ames, July

28 1950, D.L. Goleman, swept red clover (IOW); ♂ Ute, June 15 1960, W.S. Craig (USNM). **Maryland:** 2 ♀♀ 4 ♂♂ Patuxent Res. Refuge, August 31 1953, H. Owens (USNM); ♂ Howard Co., August 9 1961 (USNM); ♂ Prince George's County, Patuxent Research St., June 25 1982, M. Schauff (USNM); 13 ♀♀ 24 ♂♂ Prince George's Co., Bowie Wasteground, August 5 1978, E.E. Grissell (USNM); ♂ Fredktnw (paratype no. 2140) [not mentioned in original description]; ♀ Morgan Co., June 16 1952, red clover (USNM); ♂ Dorchester Co., nr. Lloyd's, July 10 1907, H.S. Barber (USNM). **Massachusetts:** ♂ N. Brookfield, August 18 1952, Nadel, clover (USNM); 2 ♀♀ Provincetown, June 28 1891, A.P. Morse (MCZ, USNM); 4 ♀♀ Lexington, June 23 1966, H.E. Evans (MCZ); 2 ♀♀ ♂ Holliston, August 7, 9, 13, N. Banks (MCZ); 2 ♀♀ Bedford, July 1-15 1968, H.E. Evans, Malaise (MCZ). **Michigan:** ♀ Wexford Co., June 14 1952, R.R. Dreisback (USNM); ♀ Midland Co., June 28 1958, R.&K. Dreisback (USNM); ♀ Wexford Co., June 15 1965, J.H. Shaddy, pit trap in scotch pine (MISS); ♀ Holland, August 4 1954, R.L. Fischer (MISS); ♂ Gladwin Co., June 10-16 1951, R.R. Dreisback (MISS); ♂ Gd. Ledge, June 29 1964, G.B. Noland (MISS); 3 ♂♂ Detroit, June 6 1937, G. Steyskal (MISS); ♀ 8 ♂♂ Bay Co., Consumers Power Co., Quanicassee Plant Site, 9 July 1973, R. L. Fischer (IDA, MISS); 4 ♀♀ 6 ♂♂ Midland Co., June/August, R.R. Dreisback (USNM); ♂ Tuscola Co., July 9 1950, R.R. Dreisback (USNM); ♂ Montcalm Co., June 20 1941, R.R. Dreisback (USNM); ♂ Crawford Co., June 21 1953, R.R. Dreisback (USNM); ♂ Saginaw Co., June 23 1952, R.R. Dreisback (USNM); ♂ Washtenaw Co., Ann Arbor, June 21 1936, G. Steyskal (USNM); ♂ Oakland Co., Milford, June 29 1923, T.H. Hubbell (USNM); ♂ Ag. Coll., C.F. Baker (USNM); ♂ Midland Co., June 14 1952, R.R. Dreisback (USNM); ♂ Rose Lake Wildf. Expt. Stn., Shiawassee Co., July 29 1972, D.K. Young (IDA). **Minnesota:** 7 ♀♀ 3 ♂♂ Pope Co., Glacial Lakes State Park, July 31, August 7, 14 1974, Malaise trap (MISS); ♀ Ft. Snelling, High Prairie, July 29 1925, C.E. Wickel (UMS). **Missouri:** ♀ Columbia, Boone Co., July 31 1967, F.D. Parker, Malaise (USNM). **Nebraska:** ♂ Broken Bow, August 1 1953, R.R. Dreisback (MISS); ♂ Thomas Co., Nebr. Nat'l Forest, 25 mi W Halsey, July 17 1967, H.B. Leech (CAS); 2 ♂♂ "Neb." (USNM). **New Brunswick:** ♂ Shediac, July 12 1940[?], G.S. Walley (BRI); 2 ♂♂ Kouchibouguac N.P., S.J. Miller (BRI). **New Hampshire:** ♂ Franconia, A.T. Slosson (AMNH). **New Jersey:** ♂ Ocean Grove, July 19 1893 (USNM). **New York:** ♀ 3 ♂♂ Ithaca, July 5 1947, W. Mason (BRI); ♀ ♂ Campus, Ithaca, June 15 1937, P.P. Baby (ZST); ♂ Auburn, July 1969, F.E. Kurczewski, wasp prey (USNM); ♂ Cayuga Co., Auburn, July 27 1970, R.C. Miller, prey from *Lindeniis errans*[?] (Fox) (USNM); 8 ♀♀ Ulster Co., Cherrytown, 4 mi NNW Kerhonkson, June 15-39 1971, P.B. Wygodzinski (AMNH). **North Carolina:** ♂ Smokemount, Swain Co., July 17 1941 (MCZ); ♂ Franklin, May 24 1957, W.R.M. Mason (BRI); ♂ Transylvania Co., Cedar Mtn., May 29 1978, J.B. Whitfield (UCB); 2 ♂♂ Cherokee, June 4 1979, M. Sharkey (LYM). **Ohio:** ♂ Lyons, July 7 1966, R. Lalonde & W. Boyle (LYM); ♂ Shaker Heights, June 17 1939, E.D. McDonald (USNM); ♂ Summit Co., August 4 1936, L.J. Lipovsky (KAN); ♂ Marietta, June 16 1957, W.A. Drew (MISS). **Ontario:** 6 ♀♀ 20 ♂♂ Mer Bleue, Ottawa, June 23, 26 1971 (BRI); 5 ♀♀ 3 ♂♂ Ottawa, June 20, 29 1955, O. Peck, swept from *Lotus corniculatus* (BRI); ♀ Ottawa, June 10 1951, O. Peck, swept from *Dactylis glomerata* (BRI); ♀ Ottawa, July 6 1947, O. Peck (BRI); ♀ Ottawa, July 15 1957, J.E.H. Martin (BRI); ♀ 3 ♂♂ Belleville, June 7, 21, July 25, August 3 1971, C.D. Rollo (GUE); ♀ 2 ♂♂ Belleville July 3, 15 1950, J.C. Martin (BRI); 2 ♂♂ Chatterton, July 24 1956, J.C. Martin (BRI); ♂ Chatterton, 13 mi N Belleville, June 20 1967, C.D. Dondale, meadow (BRI); ♀ ♂ Constance Bay, July 24 1973, L. Masner (BRI); ♀ 2 ♂♂ Bancroft, July 2 1954, J.C. Martin (BRI); 4 ♀♀ ♂ Braeside, July 2 1956, J.C. Martin (BRI); ♂ Brighton, July 4 1954, J.C. Martin (BRI); ♂ Crystal Beach, Madoc, July 27 1950, J.C. Martin (BRI); ♀ Maynooth, June 28 1955, J.C. Martin (BRI); 2 ♂♂ Actinolite, June 24 1950, J.C. Martin (BRI); ♂ Paris, June 24 1955, D.H. Pengelly (GUE); ♀ Grimsby, June 14 1977, W.A. Attwater (GUE); ♂ Pinery Pk., Grand Bend, July 14 1982, K.N. Barber (GUE); 2 ♂♂ Walpole Isl., July 13 1980, K.N. Barber (GUE); ♀ 2 ♂♂ Windsor, June 17 1980, K.N. Barber (GUE); 4 ♀♀ 12 ♂♂ Ojibway Prairie Res., June 17, 19 1980, Cashaback/Harvey/Beierl (GUE); 3 ♀♀ 4 ♂♂ Ojibway Pk., Windsor, June 10, July 11 1980, K.N. Barber (GUE); 2 ♂♂ Rondeau Pk., August 15 1980, K.N. Barber (GUE); 2 ♂♂ Pt. Pelee, July 7, 10 1980, K.N. Barber (GUE); ♀ ♂ Pt. Pelee, July 20, 22 1979, J.M. Heraty (GUE); 4 ♂♂ Ipperwash, July 14 1980, K.N. Barber (GUE); 36 ♀♀ 59 ♂♂ Ojibway Prairie Reserve, Windsor, June 11 1981, J.M. Heraty (GUE); ♀ Bells Corners, July 20 1958, S.M. Clark (BRI); ♀ Gananoque, August 14 1977, J.M. Cumming (GUE); ♂ Whitby, July 6 1974, G.J. Umphrey (GUE); ♀ ♂ Orangeville, June 30 1976, M.J. Sharkey (GUE); ♀ Belwood, July 16 1972, D.H. Pengelly (GUE); 2 ♂♂ Belwood, July 2 1965, C.J. Edwards (GUE); ♀ ♂ Arkell, June 23 1959, D.H. Pengelly (GUE); 2 ♂♂ Campbellville, June 10 1977, W.A. Attwater (GUE); ♀ Hills, July 11 1978, M. Lichtenberg (GUE); ♀ Port Rowley, July 3 1977, D. Levin (GUE); 4 ♀♀ 9 ♂♂ Priceville, June 26 1955, July 17 1956, July 7 1960, D.H. Pengelly (GUE); 2 ♂♂ Goderich, June 22 1977, K.N. Barber (GUE); ♀ Guelph, June 28 1979, J.E. Corrigan (GUE). **Pennsylvania:** 2 ♂♂ Wilawana, July 15 1937, R.H. Crandall (ARZ); 2 ♀♀ Pymatuning I., Crawford Co., June 27 1967, G.E. Wallace (CMNH); 4 ♀♀ 3 ♂♂ Pittsburg, June 16, 22 1940, G.E. Wallace (CMNH); ♂ Pittsburg, July (CMNH); ♀

Rochester, July 12 1952, G.E. Wallace (CMNH). **Quebec:** ♀ ♂ Lac Brule, August 7, 9 1945, O. Peck (BRI); ♀ Kazubazua, July 10 1947, O. Peck (BRI); ♀ Hodgens, July 23 1958, L.A. Kelton (BRI). **Tennessee:** 2 ♀♀ 3 ♂♂ Townsend, June 2 1979, M. Sharkey (LYM). **West Virginia:** ♀ "W. Va.", July 20 1891, A.D. Hopkins (USNM); ♂ Monongalia Co., June 11 1938, G.E. Wallace (CMNH).

Remarks. This species is unique within the genus because of the sculpture-free head and mesosoma (dorsally). The scutellum does not have the longitudinal carinae found in the other species.

Variation. Variability is extreme in the general colour, sculpturing and shape of the abdominal petiole, fusion of the apical flagellomeres, surface sculpture of the mesosoma and body size. Variation ranges from black specimens in New Brunswick to a mixture of light brown to black in Ontario and Michigan to black with metallic reflections in the western states. This variation is not limited to different geographical localities but can be found to some degree within almost every series.

The length of the wing disc setae, marginal fringe and stigmal spot are associated and show clinal variation from east to west, although only a few western specimens are available for verification. The Alberta and Colorado specimens almost completely lack a marginal fringe, the stigmal spot is very faint and the wing disc setae are very short (microtrichia). All of the eastern specimens have a prominent stigmal spot, long wing disc setae and almost always a complete marginal fringe of long setae (except posterior proximal margin). In Minnesota and Nebraska, the wing disc setae are slightly longer than the far-western specimens but shorter than the setae of the eastern material, the marginal fringe is complete except for the wing apex and the stigmal spot is distinct. More western material is needed to demonstrate this variation clearly.

Distribution. Generally northeastern and sparsely across the central prairies. Fig. 71.

Host and Biology. A summary of the biology and a description of the first-instar larva are found in Ayre (1962) and Heraty and Darling (1984). The adults prefer to oviposit into the buds and flower heads of various Compositae. The ant host is recorded as *Lasius neoniger* Emery (Ayre 1962) and *Lasius* sp. (Heraty and Darling 1984).

Pseudometagea bakeri Burks

Figs. 6, 55, 60, 71.

Pseudometagea bakeri Burks, 1961: 256.

Female. Length 2.0-2.4 mm. Brown to black; head and mesosoma with or without green metallic reflections; tibiae, tarsi and apices of femora light testaceous. Gaster darker ventrally, rarely all black.

Head slightly narrower than mesosoma, with gena slightly rounded ventrally (Fig. 55), temple slightly or strongly produced posterior to eye. POL 1.7-2.2 times LOL, POL 1.5-2.0 times OOL. Face broadly rounded; shallow transverse line of punctation from torulus to margin of eye; frons, vertex and gena rugulose; scrobe and face glabrous; occipital carina lacking, postoccipital carina present, occiput irregularly transverse-striate; face with short appressed setae, rarely without setae; eye bare. Eyes separated by 2.1-2.8 times their height. Malar space 1.3-1.6 times height of eye. Clypeus weakly margined. Labrum 4-digitate. Antenna 9 to 10-segmented; apical 2 flagellomeres usually fused (Fig. 6); scape short, slightly longer than broad, weakly sculptured; length of flagellum equal to width of head, stout, slightly thickening distally; first flagellomere narrow, twice longer than apical width, following flagellomeres longer than broad; sensilla comprised of dense, short setae.

Mesosoma with covering of very fine short appressed setae dorsally, mid-lobe of mesoscutum finely punctate, anterior vertical aspect rugulose, side-lobes weakly rugulose anteriorly and smooth posteriorly. Mesoscutum 2.1-2.6 times broader than long; notaulices poorly defined, vaguely reaching posterior margin (Fig. 55). Axilla scattered micro-

punctate, lacking carinae. Scutellum slightly longer than wide, rounded, with or without median depression, longitudinally striate, interstices narrow; frenum produced beyond edge of scutellum, truncate posteriorly, crenulate dorsally, areolate on vertical sides. Disc of propodeum areolate-rugose, interstices wide, postspiracular furrow shallow and narrow; callus ridge indistinct ventrally, with short setae dorsally, not extending ventrally along ridge; metepisternum longitudinally reticulate or alveolate, produced dorsally as a ridge separated by a deep furrow from propodeum. Prepectus without oblique furrow; reticulate to finely alveolate. Proepisternum finely alveolate. Coxae globose, finely alveolate, bare. Legs stout, femora scabriculous with sparse appressed setae; tibiae with setae sparse dorsally, dense ventrally. Forewing 2.1-2.6 times as long as broad; costal cell with irregular row of sparse short setae on dorsal and ventral surfaces; basal area bare, disc of wing covered dorsally and ventrally with microtrichia, longer apically; sparse marginal fringe of setae restricted to apical third of posterior margin; wing veins poorly defined, postmarginal vein absent, stigma small, rounded. Hindwing 3.8-4.3 times as long as broad; marginal fringe of long setae restricted to posterior margin.

Petiole 1.0-1.1 times as long as wide, 0.8-1.0 times as long as metacoxa; globose, not distinctly bilobed dorsally; anterior half areolate-rugose, strongly tapering, with shallow depression dorsally, posterior half glabrous, strongly tapered, flattened dorsally and laterally. Gaster glabrous.

Male. Length 1.9-2.2 mm. Colour as in female but usually darker, gaster always uniform in colour. Malar space 1.1-2.1 times height of eye. Antenna 11-segmented; flagellum longer than in females, 1.2 times width of head. Postspiracular furrow usually more pronounced than female. Petiole 1.4-1.8 times as long as broad; anterior half narrow, equal in length to posterior half, cylindrical, with or without longitudinal margined groove dorsally, dorsal angle usually acute. Gaster short, rounded, 0.9 times as long as mesosoma, with sparse microtrichia dorsally. Genitalia large (as in Fig. 9).

Type Material Examined. *Holotype* of *Pseudometagea bakeri* Burks (♀) is "type 65750" (USNM) labelled "Colo 1563, Coll. C.F. Baker" [=Ft. Collins, Colorado, sweeping, June 13 1895, C.F. Baker; data taken from original description] *Paratypes*: 11 ♀♀ 37 ♂♂ with information reported in the original description: collected from June 20 - August 4 1895 at Ft. Collins, Colorado; Camptons, Colorado; and in July 1920 at Centennial, Wyoming, 4 ♂♂ swept from *Carex*.

Other Material Examined. 29 ♀♀ 99 ♂♂. **Alberta:** 9 ♀♀ 18 ♂♂ Scandia, June 26, July 9, 10 1956, O. Peck, swept from grass range (BRI); 4 ♀♀ 8 ♂♂ Medicine Hat, July 16, 1956, O. Peck, swept from *Agropyron cristatum* (BRI); ♂ Oldman River, Lethbridge, June 22 1956, O. Peck (BRI); 2 ♂♂ Lethbridge area, 1924-26, H.L. Semans[?] (BRI); 6 ♂♂ Steeveville, August 21 1957, A.R. & J.E. Brooks (BRI); ♀ Gilchrist Ranch, Aden, June 28 1956, O. Peck, swept from crested wheatgrass (BRI); ♀ Turin, June 28 1938, R.W. Salt, host alfalfa (BRI). **Colorado:** ♀ (1582) Chamber's Lake, July 18 1895, C.F. Baker, misc. sweeping (USNM); ♀ 12 ♂♂ (2142) Ft. Collins, June 29 1896, C.F. Baker, general collecting - mostly *Carex* (USNM); 4 ♀♀ 10 ♂♂ (2191) Ft. Collins, June 11 1896, C.F. Baker, in meadow - mostly *Carex* (USNM); ♂ Fort Collins, Baker (USNM); ♂ Colo. Spr. 6000'-7000', June 15-30 1896, H.F. Wickham (BRI); ♀ Lodore, June 23 1946, M.T. James (COL); 2 ♂♂ Lindon, June 21 1937, C.L. Johnston (KAN); ♂ Pagosa Springs 7200', June 22-24 1919 (AMNH); ♂ Mishawauka, July 11 1937, C.L. Johnston (KAN). **Iowa:** ♂ July 1893[?] (USNM). **Minnesota:** ♂ Pope Co., Glacial Lakes St. Pk., July 4 1973, Malaise (UMS). **Montana:** 3 ♀♀ 4 ♂♂ 1.5 mi S, 5 mi W Winnett, Petroleum Co., June 16 1969, May [?] 28 1970, A.G. Hamilton (USNM); ♂ Glendive, Dawson Co., June 21 1956, R.C. Froeschner (MON). **New Mexico:** ♂ Ruidoso, June 26 1940, D.E. Hardy (KAN); 3 ♀♀ 23 ♂♂ Springer, July 28 1909, C.N. Ainslie (USNM). **North Dakota:** ♂ New England, July 1918, C.N. Ainslie, swept from *Agropyron* (USNM). **Saskatchewan:** ♂ Willow Bunch, July 24 1955, C.D. Miller (BRI). **South Dakota:** ♀ 1967, sweeping wheat (USNM). **Utah:** ♂ (1650) "S.W. Utah", 1895, C. Palm (USNM); ♀ 2 ♂♂ Utah Co., G.E. Wallace (CMNH).

Remarks. This species appears to be restricted to the prairie grasslands and is the only widespread member of the *schwarzii* group which is characterized by longitudinal carinae on the scutellum. Collections have been made from two species of *Agropyron* (Gramineae) and in this preferred oviposition site it resembles the habits of *P. montana*. *Pseudometagea*

bakeri is most closely related to the Californian species *P. hirsuta* and differs largely in the length of the setae on the dorsum of the mesosoma.

Variation. There is large variation in the degree of metallic colouration on the head and mesosoma (zero to complete), body colour, sculpture, and general body size. There is also variation in the elevation of the scutellum compared to the mesoscutum. In the type series, most of the specimens from Colorado and a series of 7 males from Steveville, Alberta, the scutellum and mesoscutum are on the same longitudinal plane. As well, the specimens from Steveville are the only specimens which are metallic over the entire mesosoma. The remaining specimens, including two long series from Medicine Hat, Alberta and Scandia, Alberta, have the scutellum on a lower plane. There are specimens belonging to single series of both groups which have the features of the other. *Pseudometagea schwarzii* also has series with differences in the plane of the scutellum and mesoscutum. It is hard to say if the transcutal furrow is flexible in the adult or whether it is a result of differential development in the pupal stages.

Distribution. Central plains. Fig. 71.

Biology. Two large series of *P. bakeri* from Alberta were taken from a grass range and from crested wheatgrass, *Agropyron cristatum* (L.) (Gramineae). The type series was collected from *Carex* (Cyperaceae) in Colorado. Only a single specimen from Turin, Alberta was collected from a legume, alfalfa (*Medicago sativa* L., Fabaceae). The ant host is unknown.

Pseudometagea hirsuta new species

Figs. 7, 71.

Female. Length 2.0 mm. Light brown; tibiae and tarsi dark testaceous. Gaster darker ventrally. Strongly infusate along basal vein of forewing.

Head large, slightly broader than mesosoma, gena only slightly rounded, temple broadly and strongly produced. POL 1.7-2.1 times LOL, POL 1.6-1.8 times OOL. Face broadly rounded; weak transverse line of punctuation from torulus to margin of eye; frons, vertex and gena finely rugulose, face and scrobe ventrally smooth; occipital carina lacking; postgenal carina vague; occiput weakly areolate; head covered by short appressed setae, these longer on face below toruli; eye bare. Eyes separated by 2.4 times their height. Malar space 1.3 times height of eye. Clypeal margins weakly impressed. Labrum appearing 4-digitate. Antenna 10-segmented, apical 2 flagellomeres fused, conical apically (Fig. 7); scape short, twice longer than broad, weakly sculptured; length of flagellum slightly greater than width of head, slightly thickening distally, first flagellomere 2.7 times as long as apical width, following flagellomeres longer than broad to subquadrate apically; sensilla comprised of dense, long setae.

Mesosoma with dense covering of fine inclinate setae dorsally, mesoscutum scattered-micropunctate, lightly rugose on anterior vertical face tapering to narrow faint median depression extending to posterior edge. Mesoscutum 2.1 times broader than long dorsally, notaulices distinct and reaching posterior margin. Axilla smooth and shining, lacking carinae. Scutellum as long as wide, broadly rounded, longitudinally striate, interstices narrow; frenum produced beyond edge of scutellum, truncate posteriorly, confused-crenulate dorsally, rugose laterally and ventrally. Disc of propodeum areolate, interstices large; postspiracular furrow shallow; callus ridge weak ventrally, setae of callus continuing along ridge to base of metacoxa; metepisternum finely alveolate. Prepectus with shallow oblique furrow, rugulose to areolate. Proepisternum finely alveolate. Coxae globose, scabriculous, pro- and metacoxa setose ventrally. Legs stout, femora scabriculous with long appressed setae; tibiae and tarsi with weak sculpturing and long inclinate setae. Forewing 2.2-2.3 times as long as broad; costal cell with sparse long setae on dorsal and ventral surfaces, basal area bare except scattered setae dorsally along cubital vein; disc of wing covered dorsally and ventrally by dense setae, sparse fringe of short setae around margin of wing except basal half of posterior margin; wing veins distinct, postmarginal

vein short, less than width of stigma; stigma large, as broad as long. Hindwing 4.0 times as long as broad; marginal fringe of short setae restricted to posterior margin.

Petiole 0.9-1.0 times as long as broad, 0.9-1.0 times as long as metacoxa, globose, not distinctly bilobed dorsally; anterior half areolate-rugose, tapering; posterior half glabrous, strongly tapered, flattened dorsally and laterally. Gaster elongate, 1.7 times as long as high, glabrous.

Male. Length 2.3 mm. Colour pattern as in female but darker, gaster uniform in colour. Head as broad as mesosoma; narrow glabrous furrow along OOL, rugulose sculpture more extensive around face, postgenal carina distinct. Malar space 1.2 times height of eye. Antenna 11-segmented; flagellum longer than in female, 1.5 times head width. Petiole 1.5 times as long as metacoxa; anterior half narrow, cylindrical, lacking dorsal carinae, shorter than expanded posterior half; dorsal angle of posterior half not acute, glabrous, side-lobes slightly expanded. Gaster short, rounded, 0.9 times as long as mesosoma, sparse appressed microtrichia dorsally.

Type Material Examined. *Holotype* ♀, *Allotype* ♂, *Paratype* ♀, Oroville, Cal. [CALIFORNIA], VII.23.1926, H.H. Kiefer Collector. Deposited in CAS.

Remarks. Represented by a single series from California, this species is closely related to *P. bakeri* and is separated most easily by the presence of dense, erect hairs over the dorsum, and dense long setae covering the femora and tibiae.

Distribution. California. Fig. 71.

P. occipitalis group

Group Diagnosis. Forewing infusate except basal and costal cell, and below marginal vein, darker along cubital and medial veins. Interocellar space without depression; temple small, hardly produced past posterior margin of eye; postoccipital carina lacking, postgenal carina present (Fig. 66), eye setose. Lateral margin of clypeus deeply impressed (Fig. 61). Antennal scrobe shallow, sculpture continuous with frons. Scape more than twice as long as broad, reaching just over halfway to median ocellus. Antenna scabriculous, scape weakly sculptured.

Notaulices of mesosoma reaching posterior margin. Axilla smooth, longitudinally striate (Fig. 66). Scutellum rounded, frenum truncate. Disc of propodeum areolate; callus areolate, not forming a distinct ridge posteriorly; metepisternum distinct, separated from propodeum by broad furrow. Proepisternum glabrous. Coxae smooth and shining with sparse lateral setae. Outer metatibial spur either distinct and half as long as inner, or reduced and indistinguishable from apical setae.

Petiole 2-3 times as long as broad, only slightly expanded medially, 2.0-3.0 times longer than hind coxa in female, flattened dorsally with erect setae laterally. First sternite of gaster not constricted basally. Hypopygium of female with 6-10 long apical setae. Male gaster elongate (Fig. 23).

Pseudometagea occipitalis new species

Figs. 13, 17, 21, 23, 61, 66, 72.

Female. Length 1.8-2.2 mm. Dark brown to black; head and scutellum with weak blue-green metallic reflections; antenna, coxae and femora brown; tibiae, tarsi and apices of femora testaceous. Gaster darker ventrally.

Head subtriangular, gena not broadly rounded (Fig. 61). POL 2.1-2.2 times LOL, POL 1.4-1.5 times OOL. Frons, scrobe, vertex and occiput rugulose; gena weak or strong-rugulose; face including clypeal region smooth; face and eye covered by sparse, long, erect setae. Eyes separated by twice their height. Malar space 0.9-1.0 times height of eye, malar depression less than one-eighth of malar space or absent. Mandibles as in Fig. 20. Labrum 3 to 4-digitate. Antenna 10 to 11-segmented, apical two flagellomeres partially or completely fused, conical apically (Fig. 13); scape twice as long as broad, flagellum

slightly longer than width of head, stout, not thickening distad, first flagellomere 2.6 times as long as apical width, following flagellomeres slightly longer than broad to quadrate distally; sensilla comprised of sparse, long, decumbent setae.

Mesosoma with covering of erect setae dorsally. Mesoscutum 1.8-2.1 times broader than long, smooth and shining, anterior vertical aspect weakly areolate-rugose, notaulices distinct and weakly reaching posterior margin. Scutellum slightly longer than wide, with weak median depression, rounded posteriorly, longitudinally strigate, interstices narrow; frenum slightly produced beyond edge of scutellum, rugose. Disc of propodeum rounded, areolate-rugose; postspiracular furrow indistinct (Fig. 66); callus with several long erect hairs; metepisternum weakly alveolate, demarked dorsally by sharp, deep furrow. Proepisternum glabrous. Prepectus rugulose. Legs slender, femora smooth and shining with sparse, long, semi-erect setae; tibiae and tarsi with dense, long, decumbent setae. Forewing 2.1-2.3 times as long as broad; both surfaces of costal cell with sparse fine setae, basal area below submarginal vein with scattered setae on both sides, disc of wing covered dorsally by short setae and ventrally by microtrichia, sparse marginal fringe of setae restricted to basal two-thirds of anterior margin and apical third of posterior margin; wing veins distinct, postmarginal vein vague, 0.2 times length of marginal; stigma large, rounded (Fig. 21). Hindwing 3.8-4.3 times as long as broad; except for few short setae, marginal fringe restricted to posterior margin.

Petiole 2.5-2.8 times as long as broad, 1.3-1.5 times as long as metacoxa, slightly expanded medially, with few fine longitudinal carinae laterally, glabrous. Gaster glabrous.

Male. Length 1.9-2.3 mm. Darker brown than female with blue metallic reflections more extensive on head and dorsum of mesosoma. Antenna 12-segmented (Fig. 17); flagellum longer than in females, 1.4 times width of head. Median depression of scutellum and postspiracular furrow more prominent than in female. Petiole 3.2-3.6 times as long as broad, 2.6-2.8 times as long as metacoxa, cylindrical, glabrous, without lateral carinae, two parallel basal carinae dorsally. Gaster elongate, 2.6-2.8 times as long as wide with few dorsal microtrichia (Fig. 23).

Type Material Examined. *Holotype* ♀, 11 mi. e Libby, Lincoln Co., Mont. [MONTANA], July 20, 1955, R.C. Froeschner. Deposited in USNM. *Paratypes*: 7 ♀♀ 3 ♂♂ **Alberta**: ♂ Elkwater Lake, July 19 1956, O. Peck (BRI). **Arizona**: ♂ Eagar, Ranger Station, June 25 1957, G. Butler & F. Werner (ARZ). **British Columbia**: ♀ Elko, E. Kootenay, July 9 1949, H.B. Leech (CAS). **Colorado**: ♂ Dolores Co., Cottonwood Spring, 21 mi NE Dolores, Montezuma Co., 7800', July 23 1976, N.L. Hernan (AMNH). **Montana**: 6 ♀♀, same data as holotype (4 ♀♀ MON, 2 ♂♂ USNM).

Remarks. This species differs from *P. rugosa* in the restricted sculpture on the mesoscutum, large erect setae on the dorsum and head, and only faint metallic reflections dorsally.

Included in this species is a single specimen from Arizona (♀ S.W.R.S., Cochise Co. 5400', 5 mi W Portal, June 30 1970 (SWRS) [lacks petiole and abdomen]) although it may represent a different species. The lack of a metasoma yields the specimen unsuitable for accurate placement. Many characters are shared with the type material of which the most notable are the long erect setae on the eye, reduced metatibial spur and restricted metallic colouration. The differences from the type material (which have little morphological variation over the range) are as follows: setae of face short and appressed; first flagellomere 3.0 times as long as apical width, not enlarged from base to apex; dorsum of mesosoma with short appressed setae, weakly rugulose over entire mid-lobe of mesoscutum; scutellum faintly longitudinally striate, more reticulate in sculpture; metepisternum with broad shallow furrow; basal cell of forewing with sparse short setae, costal cell setae short.

Distribution. Central North America. Fig. 72.

Pseudometagea rugosa new species

Figs. 14, 72.

Female. Length 2.5-2.9 mm. Head and mesosoma with dark metallic green reflections; antenna, coxae and femora dark brown; tibiae, tarsi and apices of femora light testaceous. Gaster dark brown, with or without faint green tinge above.

Head slightly transverse, 1.5 times wider than long, gena not broadly rounded. POL 2.2-2.9 times LOL, POL 1.5-1.6 times OOL. Frons, scrobe, vertex and face lateral to clypeal area weakly rugulose; clypeus and supraclypeal area smooth and shining; occiput with fine, transverse striae; face covered by sparse, very short appressed setae, frons essentially bare, eye with sparse, short, erect setae. Eyes separated by 2.1-2.2 times their height. Malar space 1.0-1.2 times height of eye, malar depression shallow but broadly impressed. Mandibles large, basal teeth of right mandible well developed. Labrum 4-digitate. Antenna 11-segmented, rounded apically (Fig. 14); scape 3.0 times as long as broad; flagellum 1.1 times as long as width of head, stout, slightly thickening apically, first flagellomere 2.7 times as long as apical width, following flagellomeres longer than broad; sensilla comprised of dense, short setae.

Mesosoma with covering of short appressed setae dorsally, dense on mesoscutum, sparse over scutellum. Mesoscutum 2.0-2.1 times broader than long, mid-lobe of mesoscutum weakly rugulose over entire surface, side-lobe smooth and shining, notaulices faint but reaching posterior margin. Scutellum as long as wide, rounded posteriorly, with shallow median depression, weakly rugulose; frenum produced slightly beyond apical edge of scutellum, rugulose. Disc of propodeum rounded, areolate; postspiracular furrow broad and shallow; callus with dense setae continuing as a row to base of metacoxa; metepisternum rugose, demarked dorsally by strong furrow. Proepisternum glabrous. Prepectus rugulose. Legs slender, femora and tibiae smooth and shining with erect setae, tarsi dense setose. Forewing 2.2-2.4 times as long as broad; costal cell with sparse microtrichia dorsally and ventrally; basal area with very few setae, disc of wing covered by microtrichia ventrally, bare dorsally, posterior margin with fringe of sparse setae apically; wing veins distinct; postmarginal vein present, 0.3 times marginal; stigma small, elongate. Hindwing 3.9-4.3 times as long as broad, marginal fringe restricted to posterior margin.

Petiole 3.0 times as long as broad, 1.5-1.8 times as long as metacoxa, slightly expanded medially and ventrally, with fine longitudinal carinae, long erect setae basolaterally and dense basoventrally. Gaster smooth, few microtrichia basally on first tergite.

Male. Length 2.8 mm. Colour as in female but darker. Rugulose sculpture more extensive than in female. Antenna 12-segmented, flagellum longer than in female, twice width of head. Petiole 5.3 times as long as broad, 2.4 times as long as metacoxa, cylindrical, and dorsally flattened with pair of fine dorsolateral longitudinal carinae. Gaster elongate, 3.0 times as long as high, 1.1 times as long as mesosoma, with sparse appressed setae dorsally.

Type Material Examined. *Holotype* ♀, *Allotype* ♂, *Paratype* ♀, MEX. [MEXICO], Dgo. [Durango], 9000', El Salto, 10 mi. W., 7 June 1964, W.R.M. Mason. Deposited in BRI.

Remarks. This is a more robust species than *P. occipitalis*, which has extensive metallic colouration over the entire body and a completely rugulose mesoscutum.

Distribution. Mexico. Fig. 72.

P. montana group

Group Diagnosis. Forewing hyaline or infusate, with faint darker infuscation along cubital vein.

Interocellar space with weak median depression, postgenal carina absent, eye setose. Lateral margins of clypeus faintly impressed. Antennal scrobe shallow, smooth and shining. Scape longer than broad, reaching median ocellus or almost so. Antenna scabricu-

lous, scape weakly sculptured.

Notaulices of mesosoma weak. Axilla weakly sculptured, lacking carinae. Scutellum elongate, frenum emarginate or rounded. Disc of propodeum areolate; callus striate to rugulose, not forming a distinct ridge posteriorly; metepisternum distinct, separated from propodeum by deep or shallow furrow. Proepisternum glabrous. Coxae weakly sculptured. Outer metatibial super indistinct from apical setae. Stigma of forewing vague or absent.

Petiole 2-3 times as long as broad, only slightly expanded medially and slightly flattened dorsoventrally, 1.2-1.4 times longer than metacoxa in both sexes. First sternite of gaster with or without weak basal constriction (Fig. 46). Hypopygium of female with 15-20 long apical setae. Male gaster rounded.

***Pseudometagea montana* (Ashmead) new combination**

Figs. 15, 18, 20, 49, 52, 56, 72.

Stibula [?] *montana* Ashmead, 1890: 24.

Stilbula montana; Ashmead 1892: 356.

Female. Length 2.0-2.6 mm. Brown to black; tibiae, tarsi and apices of femora testaceous. Gaster brown ventrally in lighter specimens. Wings infusate, darker along cubital vein.

Head subtriangular, gena rounded, slightly bulging lateral to mandibles. POL 1.9-2.5 times LOL, POL 1.5-1.8 times OOL. Frons and vertex granulate, face and scrobe smooth and shining, occiput transversely aciculate; head covered by dense appressed setae except in scrobe, occiput and a narrow line along the OOL; eye densely setose. Eyes separated by 1.9-2.1 times their height. Malar space 0.9-1.2 times height of eye, malar depression absent. Supraclypeal area only slightly raised above level of face. Mandibles as in Fig. 20. Labrum 4 to 5-digitate. Antenna 11 to 12-segmented (Fig. 15), apical flagellomeres separated or partially fused; scape 4.0 times as long as broad, reaching median ocellus; flagellum longer than width of head, stout, not thickening distally, first flagellomere 3.0 times as long as apical width, equal in length to scape, as long as two following flagellomeres combined, following flagellomeres longer than wide and becoming quadrate apically; sensilla comprised of dense long setae.

Mesosoma with covering of dense appressed setae (Figs. 52, 56), except vertical face of mesoscutum, pronotum, proepisternum and propodeal disc bare; sculpture granulate. Mesoscutum 1.7-2.0 times broader than long, notaulices absent. Axilla smooth to lightly granulate, transcutal furrow narrow. Scutellum longer than wide, tapering apically, with median longitudinal depression, finely and longitudinally strigate (Fig. 56); frenum produced beyond edge of scutellum, strongly emarginate apically, scabriculous. Disc of propodeum areolate-rugose; postspiracular furrow shallow; callus lightly longitudinally strigate, with dense erect setae; metepisternum longitudinally reticulate or alveolate, separated dorsally by shallow furrow. Prepectus scabriculous. Coxae large, subglobose, sculpture granulate, densely pubescent. Legs stout, sculpture granulate, densely appressed-setose. Forewing 2.3-2.5 times as long as broad; entire wing surface covered by dense setae dorsally and ventrally, fringe of long setae along anterior wing margin, around apex and posterior apical third; wing veins poorly defined, postmarginal vein present, 0.3 times as long as marginal, stigma oblong or absent. Hindwing 4.2-5.0 times as long as broad, fringe of hairs around entire wing margin.

Petiole 2.3-2.8 times as long as broad, with shallow dorsal depression, cylindrical, smooth and shining with sparse lateral fringe of short setae. Gaster elongate, 1.6 times as long as high (Fig. 49), smooth and shining; covered by appressed setae, tergites bare apically; first gastral sternite slightly constricted basally, basal constricted area glabrous.

Male. Length 2.1-2.5 mm. Colour as in female, gaster darker, uniform in colour. Antenna 12-segmented (Fig. 18). Mesosoma slightly more elongate than in female. Petiole and gaster as in female [no dimorphism].

Type Material Examined. *Lectotype* of *Stilbula montana* Ashmead (♀) is "type 2131" (USNM) labelled "West Cliff, Col., Type". *Paralectotype* ♀ with the same data.

Other Material Examined. 117 ♀♀ 4 ♂♂. **Alberta:** 7 ♀ Calgary, July 1980, R.B. Madge (BMNH, GUE); 8 ♀♀ Red Deer, June 25 1957, Brookes & MacNay (BRI); 2 ♀♀ Devon, July 11 1978, R. Roughley (GUE). **Arizona:** 8 ♀♀ Marshall Gulch Sta., Catalina Mts., August 1959, F. Werner, ovip. in green seeds of *Koeleria cristata* (USNM); ♀ Pima Co., Ben Wallow, Santa Catalina Mts., 8200', July 25, 1965, R & J Matthews (MISS); 6 ♀♀ Sta. Rita Mts., Madera Canyon For., August 11 1977, L. Masner (BRI); 23 ♀♀ Box Canyon, 7000', ca. 2-3 mi W Ramsay Cyn bird sanctuary, Huachuca Mtns, August 14 1984, J.M. Heraty, ovipositing in *Panicum hallii* Vasey and *Dactylis glomerata* L. (Gramineae) (GUE). **Colorado:** ♀ Teller Co., Florissant, Petrified Forest Area, 2530m, August 11 1973, P.H. Arnaud, Jr (CAS); ♀ Summit Road, Ouray, July 11 1919 (AMNH); ♀ Saguache, July 4 1938, M.T. James & U. Lanham (COL); ♀ Mt. Vernon Cn., nr. Golden 7200', July 31 1961, W.R.M. Mason (BRI), 2 ♀♀ S base Blue Mtn., 8426', nr. Florissant, Teller Co., August 1 1966, T. Emmel & M. Fosdick (LACM); 3 ♀♀ Cimarron Canyon, 10-12 mi below Eagle's Nest, August 4 1950 (WAS). **Michigan:** ♀ Menominee Co., July 31 1937, R.R. Dreisback (MISS); 2 ♀♀ Christmas, Alger Co., July 25 1971, D.D. Wilder (MISS). **Minnesota:** ? Olmstead Co., July 18 1906, C.N. Ainslie, from timothy (USNM); ♀ Aitkin Co., August 7 1973, D.F. Raw (UMS); ♀ Lincoln Co., August 14 1936, H.R. Dodge (UMS); 5 ♀♀ Itasca Park, July 12, August 5 1938, K.G. Kobes/H.E. Milliron (UMS); ♀ Lake Itasca, June [?] 1911 (UMS). **Montana:** ♀ nr. Missouri River, Richland Co., July 15 1957, R.C. Froeschner (MON). **New Brunswick:** ♀ St. Andrews, August 9 1957, G.E. Shewell (BRI); 13 ♀♀ ♂ Kouchibouguac N.P. August 3-5, 15, 20 1977, S.J. Miller (BRI). **New Mexico:** ♀ Ruidoso, Lincoln Co., July 2 1961, G.C. Eickwort (MISS); 16 ♀♀ ♂ Karr Cyn., 8000', Lincoln Nat. For., July 30 1977, L. Masner (BRI). **North Dakota:** ♂ Drayton, July 9 1935, D.G. Denning (UMS). **Nova Scotia:** 13 ♀♀ ♂ Lockport, July 20, 21, 31, August 1, 1958, J.R. Vockeroth (BRI); ♀ Truro, July 31 1913 (USNM); ♀ Pleasant Bay, August 10 1961, G.S. Walley (BRI); ♀ Lawrenceton, Halifax Co., July 19-20 1967, D.M. Wood (BRI). **Ontario:** ♀ Ottawa, July 7 1943, O. Peck (BRI); ♀ Prescott, July 20 1977, K.N. Barber (GUE); ♀ Ottawa, September 19 1970, A. Sauve, swept from brome grass (BRI); ♀ Ottawa, July 7 1943, O. Peck (BRI); ♀ Ottawa, August 25 1960, O. Peck (BRI); ♀ Rainy River, July 14 1960, S.M. Clark (BRI); ♀ Elora, August 16 1976, E.A. Innes (GUE); 12 ♀♀ Johnstown, August 3-4 1980, K.N. Barber (GUE); 78 ♀♀ Johnstown, July 24 1982, J.M. Heraty (GUE). **Oregon:** ♀ Sand Lake, Tillamook Co., July 7 1962, G.C. Eickwort (MISS). **Prince Edward Island:** 2 ♀♀ Red Point, August 10, 1963, R.L. Randall (LYM); 2 ♀♀ Dalvay House, Can. Nat. Park, August 17 1940, G.S. Walley (BRI). **Quebec:** ♀ Casapedia, August 3 1954, J.E.H. Martin (BRI); ♀ Montreal, August 19 1925, L. Daviault (BRI). **Saskatchewan:** 4 ♀♀ 50 mi E Regina, June 11 1980, S.A. Marshall (GUE); 3 ♀♀ 2 mi E Gull Lake, July 12 1980, S.A. Marshall (GUE); ♀ Wood Mountain, August 5 1955, C.D. Miller (BRI). **Wyoming:** ♀ Tie Siding, August 9 1950, R.R. Dreisback (USNM); ♀ Summit, Albany Co., 8500', August 10 1950, R.R. Dreisback (USNM).

Remarks: This species is distinguished from *P. nefrens* by the presence of developed mandibles and extensive pubescence over the entire body. *Pseudometagea montana* and *P. nefrens* share the dorsal pubescence, rugulose metacoxa and reduction of tibial spurs.

Distribution. Lower Boreal and extending along the foothills of the central states. Fig. 72.

Biology. Details of the egg-laying habits on *Poa pratensis* (Gramineae) and *Agropyron repens* (Gramineae) are given in Heraty and Darling (1984). A further oviposition record was made on the green seeds of *Koeleria cristata* (Gramineae) and collection associations have been made with timothy and brome grass, both Gramineae. Adult females collected in the Huachuca Mountains (Ramsay Canyon), Arizona, were observed ovipositing into the seed heads of *Panicum hallii* and *Dactylis glomerata*, both Gramineae, in a forest clearing at an elevation of 2000m. Dissections of some seed heads revealed similar egg clusters and locations to those previously described in Ontario (Heraty and Darling 1984). Observations at Johnstown, Ontario, showed the females to be highly selective of oviposition sites and restricted to a small area where the two previously mentioned species of *Poa* and *Agropyron* were found, even though other species of Gramineae were abundant in the area. Females would not oviposit on a bouquet of various Compositae in the lab. An unverifiable exception to this was discovered in a photographic slide [in the author's collection] provided by an amateur photographer. This slide, taken in Manitoba, shows a female of *P. montana* ovipositing into a composite flower head.

Males of *P. montana* are rare. At Johnstown, Ontario, numerous females were collected but no males were ever recovered; either mating takes place at a location away from the oviposition sites or this could be a thelytokous species.

Pseudometagea nefrens new species

Figs. 16, 19, 22, 72.

Female. Length 1.9-2.1 mm. Dark brown to black; head and mesosoma with faint blue metallic colouration; femora and apical flagellomeres of antenna brown; tibiae, tarsi and apex of femora testaceous. Gaster darker ventrally and apically. Forewing hyaline, sometimes infuscate along base of cubital vein.

Head subtriangular, gena not broadly rounded, POL 1.9-2.4 times LOL, POL 1.4-1.8 times OOL. Frons, vertex, and occiput rugulose; face and scrobe smooth; head except occiput covered by short appressed setae; eye with erect setae. Eyes separated by 2.1-2.7 times their height. Malar space 1.2-1.6 times height of eye, malar depression absent. Supraclypeal area bulging. Mandible small, peg like, acutely pointed at tip, each a single tooth (Fig. 19). Mouthparts enlarged. Labrum not visible, possibly absent or greatly reduced. Antenna 11-segmented (Fig. 16); scape 2.5 times as long as broad, almost reaching median ocellus; flagellum 1.5 times as long as width of head, stout, only slightly narrower at base than pedicel, not thickening distad, first flagellomere 2.8 times as long as apical width, as long as two following flagellomeres, following flagellomeres only slightly longer than broad to quadrate distally; sensilla comprised of dense short setae.

Dorsum of mesosoma and prepectus with silvery covering of fine appressed setae, frenum and callus with short erect setae, mesosoma otherwise bare. Mesoscutum 1.9-2.2 times broader than long dorsally, mid-lobe of mesoscutum shining and weakly granulate, anterior vertical aspect finely rugulose, notaulices visible only as weak depressions. Axilla smooth or weakly sculptured, transcutal furrow narrow. Scutellum slightly longer than wide, rounded posteriorly, without median depression, strongly granulate with barely visible fine longitudinal striae; frenum produced beyond edge of scutellum, rounded posteriorly, scabriculous, not emarginate. Disc of propodeum rounded, areolate; postspiracular furrow shallow; callus striate to rugulose, with several erect hairs; metepisternum obliquely reticulate, separated dorsally by deep furrow. Prepectus sculpture granulate. Coxae globose, granulate to rugulose basally, setae dense ventrally. Legs stout, sculpture granulate, with dense appressed setae. Forewing 2.3-2.6 times as long as broad; both surfaces of costal cell with sparse long setae; basal area bare dorsally, completely bare below cubital vein; disc of wing with dense short setae dorsally and ventrally, dense fringe of short setae around entire wing margin except basal third of posterior margin; wing veins faint, stigma absent. Hindwing 4.2-5.3 times as long as broad, fringe of hairs around entire wing margin.

Petiole 2.6-2.9 times as long as broad, with shallow longitudinal depression dorsally, curved ventrally in lateral view (Fig. 22), smooth and shining with sparse lateral fringe of short setae. Gaster elongate, twice as long as high, few scattered microtrichia dorsally, first gastral sternite not constricted basally, first sternite bare.

Male. Length 1.8-2.0 mm. Colour as in female but usually darker, metallic colouration widespread. Antenna 12-segmented. Petiole 3.4-3.8 times as long as broad, 1.4-1.5 times longer than metacoxa, cylindrical. Gaster short, rounded.

Type Material Examined. *Holotype* ♀, Medicine Hat, 14-VII-56, Alta. [ALBERTA], O. Peck Deposited in BRI. *Paratypes*: 8 ♀♀ 2 ♂♂. **Alberta**: ♀ Gilchrist Ranch, Aden, June 28 1956, O. Peck (BRI). **Idaho**: ♀ Butte Co., 6 mi S Howe, June 29 1982, M. Stafford (IDA); ♀ 6 mi S. Howe, Butte Co., July 7 1981, M. Stafford (IDA). **Michigan**: ♀ Clare Co., July 8 1950, R.R. Dreisback (USNM). **Minnesota**: ♀ Marshall Co., June 18 1936, D.G. Denning (UMS); ♂ Lancaster, June 25 1937, D.G. Denning (UMS). **Montana**: 2 ♀♀ 3 mi NW Winnett, Petroleum Co., July 16 1969, A.G. Hamilton (USNM). **Pennsylvania**: ♀ ? ♂ (Pr 2045, C.F. Baker) Philadelphia, July 27 1896, C. Liebeck

(USNM) [This is the only record of an eastern specimen with the locality taken from Baker's notes and based on the numbered specimen label. The locality is not considered as valid until more material can verify the information].

Remarks. This species is easily recognized by the reduced mandibles and enlarged mouthparts. Its distribution is generally sympatric with, but less extensive than *P. montana*, although they have not been collected together.

Distribution. Lower Boreal from the Great Lakes to Rockies. Fig. 72.

Kapala Cameron

Kapala Cameron, 1884: 102.

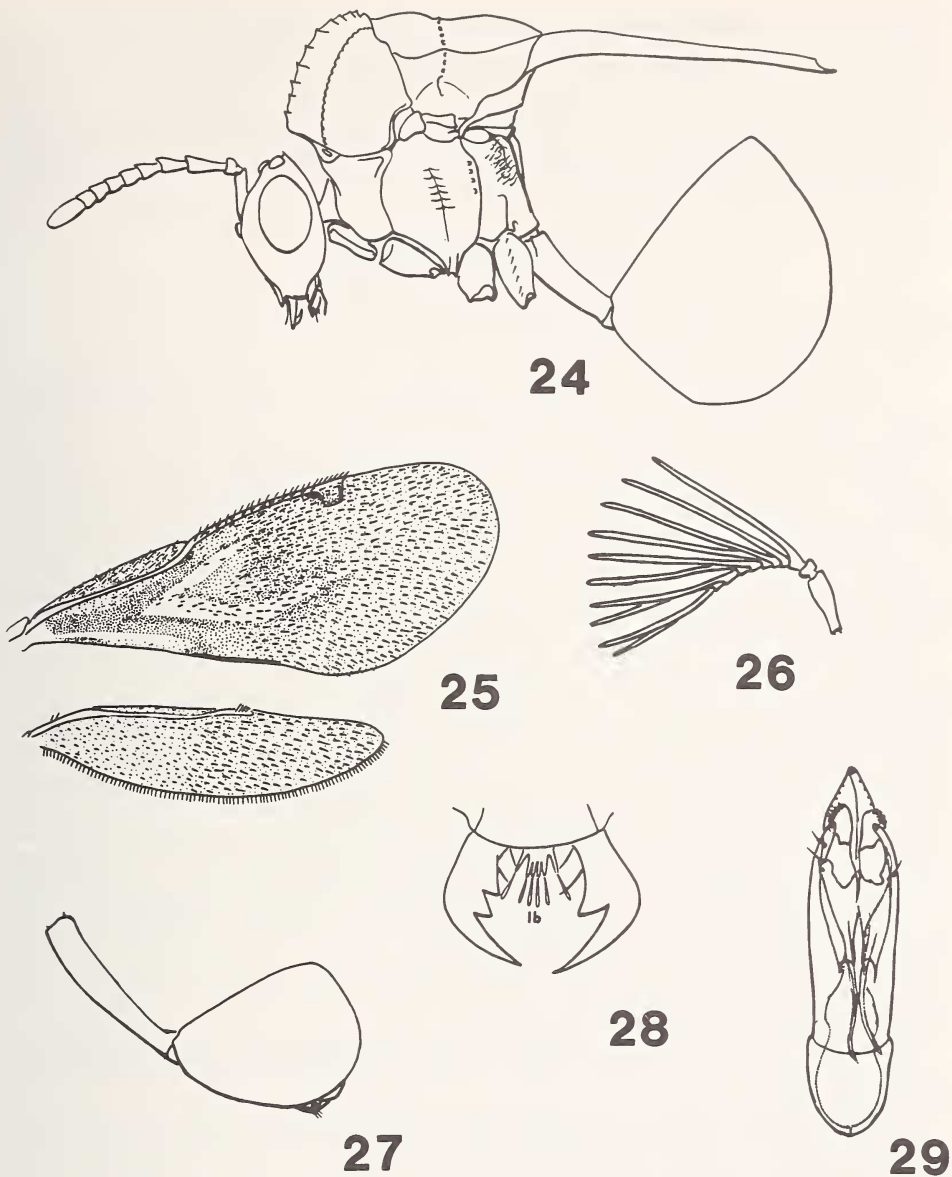
Type-species. *Eucharis furcata* Fabricius, 1804: 158 [type by original designation].

The taxonomic status of the species in this genus is uncertain. None of the types have been adequately described and at present there is no way of distinguishing species other than a few of the more distinctive forms. Previously, the *Kapala* from Texas have been referred to as *Kapala furcata* (Fabr.). I have examined the type of *K. furcata* and have found it to be a species which has been rarely collected and probably is restricted to Brazil. In North America, three "apparent" species other than *K. floridana* are found in Arizona (BRI), Texas (AMNH, KAN, TEX, USNM) and the southern tip of Florida (FLA), respectively. The availability and distinctiveness of the *K. floridana* type make it the only Nearctic species which can be identified with any certainty. A revision of the entire genus will be needed before the unidentified species can be correctly placed.

Generic Diagnosis. Head subtriangular, as broad as mesosoma. Median ocellus only slightly anterior to posterior ocelli; occipital carina strong medially, temple behind eye narrow; occiput vertical, flat. Antennal scrobe narrow, as deep as width of scape, broadly rounded laterally. Genae only slightly extended behind base of mandibles, not encircling mouthparts. Clypeus as long as wide, slightly shorter than supraclayal area; base of clypeus without distinct groove, laterally with fine groove. Mandible large, falcate, apical tooth longer than width of clypeus. Mouthparts well developed. Scape about 5.0 times longer than broad, not reaching median ocellus; antenna without basal anellus; apical two flagellomeres fused, rounded apically; flagellomeres cylindrical to weakly serrate in female, each with a long slender ramus in male.

Mesosoma robust, usually greatly elevated above dorsal margin of head; sculpture transversely carinate on mesoscutum, strongest on mid-lobe, weakening ventrolaterally on side-lobe; longitudinally carinate on axillae, scutellum and frenal spines; notaulices reaching posterior margin, widely separated apically. Axillae broadly fused medially, joined posteriorly to scutellum across broadly impressed furrow, each carina with nodule along transcutal suture. Scutellum truncate apically, only slightly narrower than mesoscutum; frenum not separated from scutellum by distinct suture, sometimes replaced by carina, frenum produced posteriorly into two long spines about equal to mesosoma in length. Disc of propodeum usually flat, vertical, callus rounded, with dense fine setae; metepisternum not distinct. Femoral groove shallow, sharply impressed dorsally. Prepectus fused to pronotum, without distinct furrow or suture, not reaching tegula; spiracle set into emargination of pronotum, not closed off dorsally. Two metatibial spurs. Marginal vein of hindwing absent. Petiole stout, cylindrical, slightly longer than metacoxa in female, much longer in male. Gaster globose, semicircular, first tergite covering following segments; first sternite smooth. Ovipositor acicular.

Distribution. Neotropics; extending into Arizona, Texas and Florida. One species recorded from northern Africa.



FIGS. 24-29. *Kapala floridana*: 24, habitus, ♀ ; 25, wings, ♀ ; 26, male antenna; 27, male metasoma, lateral view; 28, lower face in frontal view, ♀ ; 29, male genitala, ventral view.

KEY TO THE NORTH AMERICAN SPECIES OF *KAPALA* CAMERON

- 1. Scutellum gently sloped at apex to base of scutellar spines (Figs. 24, 53); propodeum including callus competely colliculate (Fig. 67); female gaster orange-brown
 *Kapala floridana* (Ashmead)
- Scutellum angled abruptly at apex to base of scutellar spines, forming a distinct arch in posterior view; propodeum weakly colliculate with glabrous areas laterally; female gaster dark brown to black *Kapala* spp.

***Kapala floridana* (Ashmead)**
 Figs. 24-29, 53, 57, 63, 67, 73.

Thoracantha floridana Ashmead, 1885a: 96; Ashmead 1885b: 11-12.
Kapala floridana; Ashmead 1892: 357.

Female. Length 2.6-3.7 mm. Black; antenna and femora brown; tibiae, tarsi and apices of femora lighter. Gastral tergites orange-brown. Wings infusate, venation dark brown, sometimes darker along cubital and medial veins.

Head 1.4-1.5 times broader than high (Fig. 63). POL 2.2-2.6 times LOL, POL 2.4-3.0 times OOL. Frons and face finely and weakly striate, scrobe variously sculptured laterally, usually smooth centrally, clypeus and supraclypeal area smooth, with sparse curved setae. Eyes separated by 2.0-2.2 times their height. Malar space 0.9-1.0 times height of eye, malar depression absent. Labrum 6 to 8-digitate, digits long (Fig. 28). Antenna 10-segmented, weakly serrate basally, first flagellomere equal to or slightly longer than second; apical segment twice longer than broad, stout; sensilla comprised of dense setae.

Mesosoma robust with strong dorsal striae (Fig. 57); prepectus, callus and dorsum with finely reclinate setae; notaulices complete dorsally. Mesoscutum 2.1-2.6 times broader than long dorsally, 1.3-1.8 times higher than long. Apex of scutellum gently sloping to level of frenal spines, not elevated between spines (Fig. 24); frenal spines stout, strongly striate; apex of spines bluntly bifurcate, 1.7-1.9 times as long as axillae and scutellum; ventral surface of frenum colliculate, usually with complete median carina (Fig. 67). Propodeum colliculate, laterally without strong sculpture, disc flat, bordered by carinae (Fig. 67). Mesepimeron weakly to strongly striate dorsally, mostly smooth (Fig. 53); femoral groove sharply defined, elongate, smooth and shining, sparsely setose. Metacoxa 1.6-2.1 times as long as wide. Legs slender, with sparse erect setae on femora and tibiae; outer metatibial spur about twice length of inner. Forewing 2.4-2.7 times as long as broad (Fig. 25); costal cell 0.3-0.4 times length of wing; ventral surface densely setose; marginal vein with few dorsal setae; basal area bare, rest of wing with dense long setae on both surfaces; postmarginal vein short, less than half length of stigma; stigma large, twice longer than broad. Hindwing 3.7-4.3 times as long as broad.

Petiole 3.1-4.1 times as long as broad, 1.4-1.6 times length of metacoxa, shagreened with irregular weak carinae. Gaster globose, semicircular, only slightly longer than high; smooth and shining.

Male. Length 3.0-3.7 mm. Colour as in female but darker, sometimes with faint cupreous reflections dorsally; gaster dark brown. Antenna 12-segmented, rami long, slender (Fig. 26); scape expanded in apical half. Dorsal median longitudinal depression of mesosoma pronounced, mesosoma dorsally striate or rugose; patches of long setae dorsally on scutellum next to inner margin of bases of frenal spines. Propodeal disc smaller than in female, with few irregular carinae, callus rugose. Petiole 6.6-8.1 times as long as wide (Fig. 27); two parallel carinae dorsally, often lacking at least in apical half. Genitalia as in Fig. 29.

Type Material Examined. *Holotype* of *Thoracantha floridana* Ashmead (♂) is "type 2827" (USNM) labelled "E. Fla., Ashmead, *Thoracantha floridana* ♂ type".

Other Material Examined. 274 ♀♀ 630 ♂♂. **Alabama:** 2 ♂♂ Cowarts, August 1-3 1916 (AMNH). **Florida:** 13 ♀♀ 12 ♂♂ Alachua Co., Gainesville, March 28 1976, E.E. Grissell,

deciduous forest (FLA): 3 ♂♂ Alachua Co., November 11 1956, R.A. Morse, sweeping weeds (FLA, USNM); 5 ♂♂ Alachua Co., August 27,28 1955, R.A. Morse, sweeping weeds (FLA, LACM); ♂ Alachua Co., Waldo Road, November 11 1927, H.E. Bratley (FLA); ♂ Gainesville, September 26- October 2 1914 (AMNH); 4 ♀♀ 5 ♂♂ Gainesville, October 24 1919, L.H. Weld (USNM); ♀ Gainesville, May 5 1967, F.W. Meads, moist oak-pine flat-woods, *Vacc. myrcinites* grass [?](USNM); 2 ♂♂ Branford, July 31 1930, R.H. Beamer (KAN); 2 ♂♂ Cocoa, July 22 1939, R.H. Beamer (KAN); ♀ ♂ Cedar Keys, June 4 (ANSP); ♀ Levy Co., Cedar Keys, August 28 1976, E.E. Grissell (FLA); ♂ Cedar Keys, July 12 1939, P.B. Lawson (KAN); 5 ♂♂ Columbia & Baker Co., Osceola Nat. For. nr. Rt. 90, May 16 - June 2, June 2-24 1977, J. Wiley, Malaise (FLA); ♀ Duval Co., Jacksonville, September 2 1957, P.H. Thompson (USNM); 2 ♀♀ ♂ Duval Co. (ANSP); 3 ♀♀ 3 ♂♂ Elfers, July 14 1939, P.B. Lawson (KAN); 2 ♂♂ Ft. George (USNM); 2 ♂♂ Ft. George, August 27 1882 (USNM); ♀♂ "Fla", July 16 1883 (USNM); ♂ Gold Head Branch St. Pk., Clay Co., May- June 1954, L.H. Krombein (USNM); ♀ 2 ♂♂ Haw Creek [?], July 1883, Schwarz (USNM); ♀ ♂ Hernando Co., Weeki Wachee Spr. August 16 1968, G.F. Hevel (USNM); ♀ Haw Creek (USNM); 4 ♂♂ Highlands Hammock nr. Sebring, May 4 1961, H.E. Evans (MCZ); ♀ ♂ Hilliard, August 19 1930, J. Nottingham (USNM); ♂ Hilliard, October 5 1938, Oman (USNM); 3 ♀♀ 13 ♂♂ Hilliard, August 19 1930, Oman/ Tuthill/ Beamer/ Nottingham (KAN); 2 ♂♂ Hillsboro, May 2-3 (USNM); ♀ Hillsborough Co., 4 mi NE Thonotosassa, August 18 1938, Hubbell-Friauf (MMZ); 2 ♂♂ Indian River (USNM); 2 ♀♀ ♂ Jacksonville, November 3 1911 (AMNH); ♀ LaBelle, July 16 1939, P.B. Lawson (KAN); ♀ 2 ♂♂ LaBelle, April 1919, J.M. Knull (USNM); 3 ♂♂ Liberty Co., Torreya State Pk., June 13,15 July 22 1974, H.V. Weems Jr. (FLA); ♂ Loughnan, August 2 1930, L.D. Tuthill (KAN); 5 ♀♀ 9 ♂♂ Marion Co., 9 mi SW Ocala, Kingland Country Est., August 27- September 4 1975, J. Wiley (FLA); 4 ♀♀ ♂ same data, September 4-10 1975, Malaise in turkey oak (FLA); 14 ♀♀ 45 ♂♂ same data, September 19- October 2 1975 (FLA); 4 ♀♀ 5 ♂♂ same data, October 2-8 1975 (FLA); 4 ♂♂ same data, October 8-13 1975 (FLA); 16 ♀♀ 42 ♂♂ same data, October 13- November 5 1975 (FLA); 38 ♀♀ 79 ♂♂ Marion Co., Lake Eaton, August 27-September 10 1975, J. Wiley, Malaise trap (FLA); 63 ♀♀ 111 ♂♂ same data, September 10- October 2 1975 (FLA); 24 ♀♀ 51 ♂♂ same data, October 2-9 1975 (FLA); 16 ♀♀ 47 ♂♂ same data, October 8-13 1975 (FLA); 42 ♀♀ 100 ♂♂ same data, October 13- November 5 1975 (FLA); 2 ♂♂ Monticello, October 4-8 1914 (AMNH); ♂ Orange Co., May 11 (USNM); ♂ 8 mi N Perry, July 12 1953, E.S. Ross (CAS); ♀ Plant City, July 14 1939, P.B. Lawson (KAN); ♀ 2 ♂♂ Putnam Co., Welaka, November 10 1939, J.J. Friauf (MMZ); 10 ♂♂ Putnam Co., 2 mi NW Orange Spr., August 2-27 1975, Drummond & Wiley, Malaise (FLA); 5 ♂♂ same data, September 10- October 2 1975, J. Wiley (FLA); ♀ 6 ♂♂ same data, October 13- November 5 (FLA); ♂ Sanford, October 3 1925, W.H. White (USNM); ♂ Sanford, April 6 1926, E.D. Ball (USNM); ♀ Sanford, May 7 1908, Van Duzee (MCZ); 5 ♂♂ Sanford, August 8 1939, R.H. Beamer (KAN); ♀ St. John's Bluff, Duval Co., August 30 1976, E.E. Grissell (FLA); ♂ St. Petersburg, April 28 1904, Van Duzee (CAS); 3 ♂♂ Tampa, May 2 1908, Van Duzee (CAS); 2 ♂♂ Tampa, April 26 (USNM); ♀♂ Taylor Co., Blue Spring Lake, June 4 1972, R. Duffield, black light (GEO); ♀ 7 ♂♂ same data, June 5 1974, C.L. Smith, black light (GEO); 1 ♂ Taylor Co., Tidewater Swamp, 10 mi W Stein Latchee, June 5 1972, C.L. Smith (GEO); ♂ Titusville, November 8 1911 (MCZ); Waldo, August 18 1930, R.H. Beamer (KAN); ♀ Wakullah, July 11 1939, P.B. Lawson (KAN); 2 ♂♂ Yankeetown, July 31 1930, L.D. Tuthill (KAN); ♀ 4 ♂♂ Zolfo Spr., July 15 1939, R.H. Beamer (KAN). **Georgia:** 23 ♀♀ 57 ♂♂ Billy Island, Okefenokee Swamp, June 1912 (COR); ♂ Billy Island, Okefenokee Sw., September 1-5 1913 (COR); ♀ 9 ♂♂ Okefenokee Swamp, August 3 1934, July 25,27, August 11 1939, Beamer/Hardy (KAN, USNM); 5 ♂♂ Waycross, October 5 1938, Oman (USNM); ♂ Beachton Chubb Place, August 7 1924, C.O. Handley (USNM); ♂ Thomasville, June 10-15, W.D. Pierce, on cotton (USNM); ♂ Tifton (USNM); ♀ 3 ♂♂ Savannah, August 10 1930, Barber (RUT); ♂ 8 mi S of Waycross, July 16 1953, E.S. Ross (CAS); ♂ Chaser's Isl., June 14 1922 (COR). **Louisiana:** ♂ Orleans Canal nr. Spanish Fort, August 5-7 1915, R & H (ANSP).

Remarks. Distinguished from other *Kapala* by the sloped scutellum, and from its closest relative, *Kapala terminalis* Ashmead by having the propodeum including the callus completely colliculate, scutellum not strongly arched medially, male petiole with parallel carinae dorsally and male rami shorter.

Distribution. Southern Georgia to southern Florida, not found south of Lake Okechobee (localities for Alabama and Louisiana could not be found). Fig. 73.

Obeza new genus

Type-species. *Lophyrocera floridana*, Ashmead 1888: 187.

The genus *Obeza* is erected to encompass the New World species which have been previously referred to *Stilbula*. *Obeza* differs from Old World *Stilbula* largely in the possession of the lateral propodeal processes (Figs. 30, 32, 68), and the posterior extension of the genae, which enclose the mouthparts, behind the mandibles. The propodeal processes of *Obeza* differ from any closely related structures in *Stilbula* by occurring laterally on the propodeal disc, but within the bounds of the postspiracular furrow (never outside). Character states shared with the Australasian *Stilbula* are the prepectus not reaching the tegula, transverse head, cylindrical antenna, lateral mesocoxal carina, frenal processes, and a similarly patterned colouration of the mesosoma. The frenal processes are similar apically in the bifurcated spines but the basal unbranched portion of the spines is much shorter in all of the New World species.

Obeza shares several character states with *Lophyrocera* including the frenal and propodeal processes, the genae strongly produced behind the mandibles but not fused, and a lateral mesocoxal carina. *Obeza* retains the plesiomorphic features of cylindrical antenna and two metatibial spurs. *Obeza* is more distantly related to *Pseudochalcura* as evidenced by the transverse shape of the head, globose mesosoma, gena produced behind the mandibles and lateral mesocoxal carina. These three genera form a monophyletic group unique to the New World which are sister to *Stilbula*.

Generic Diagnosis. Head transverse, narrower than mesosoma. Median ocellus only slightly anterior to posterior ocelli; occipital carina strong; temple behind eye narrow; occiput vertical, flat. Antennal scrobe narrow, as deep as width of scape, sharply margined laterally. Genae not completely fused behind mandibles, not strongly angulated, angle between ventral and posterior faces more than 110° , with circular opening for mouthparts (Fig. 69). Clypeus as long as wide, shorter than supraclypeal area; base of clypeus without distinct groove, laterally with fine groove. Mandible large, falcate, apical tooth longer than width of clypeus. Mouthparts reduced, visible externally. Scape short, only slightly longer than broad, not reaching median ocellus; antenna without basal anellus, stout, cylindrical in both sexes, longer than width of head.

Mesosoma globose, colour pattern as in Fig. 30, notaulices broadly impressed, joining at posterior margin. Axillae broadly fused medially, joined posteriorly to scutellum across deep, broad, crenulate furrow. Scutellum broadly rounded, narrower than mesoscutum, usually produced apically into blunt process; frenum produced into two narrow apical processes. Disc of propodeum broadly concave, produced as blunt propodeal processes dorsolaterally between propodeal disc and spiracle, with numerous long setae; callus rounded, with several long setae; metepisternum not distinct. Femoral groove shallowly and broadly impressed. Prepectus fused to pronotum, without distinct groove or furrow, not reaching tegula; spiracle recessed into dorsal margin of pronotum and enclosed dorsally; distance between spiracle and dorsal margin narrow. Anterior margin of metasternum sharply produced between metacoxae. Procoxa elongate, meso and metacoxae globose; mesocoxa with lateral carina. Two metatibial spurs. Marginal veins of forewing distinct, not discernible in hindwing.

Petiole stout, more than twice length of metacoxa. Gaster globose, first tergite covering following segments. Ovipositor acicular.

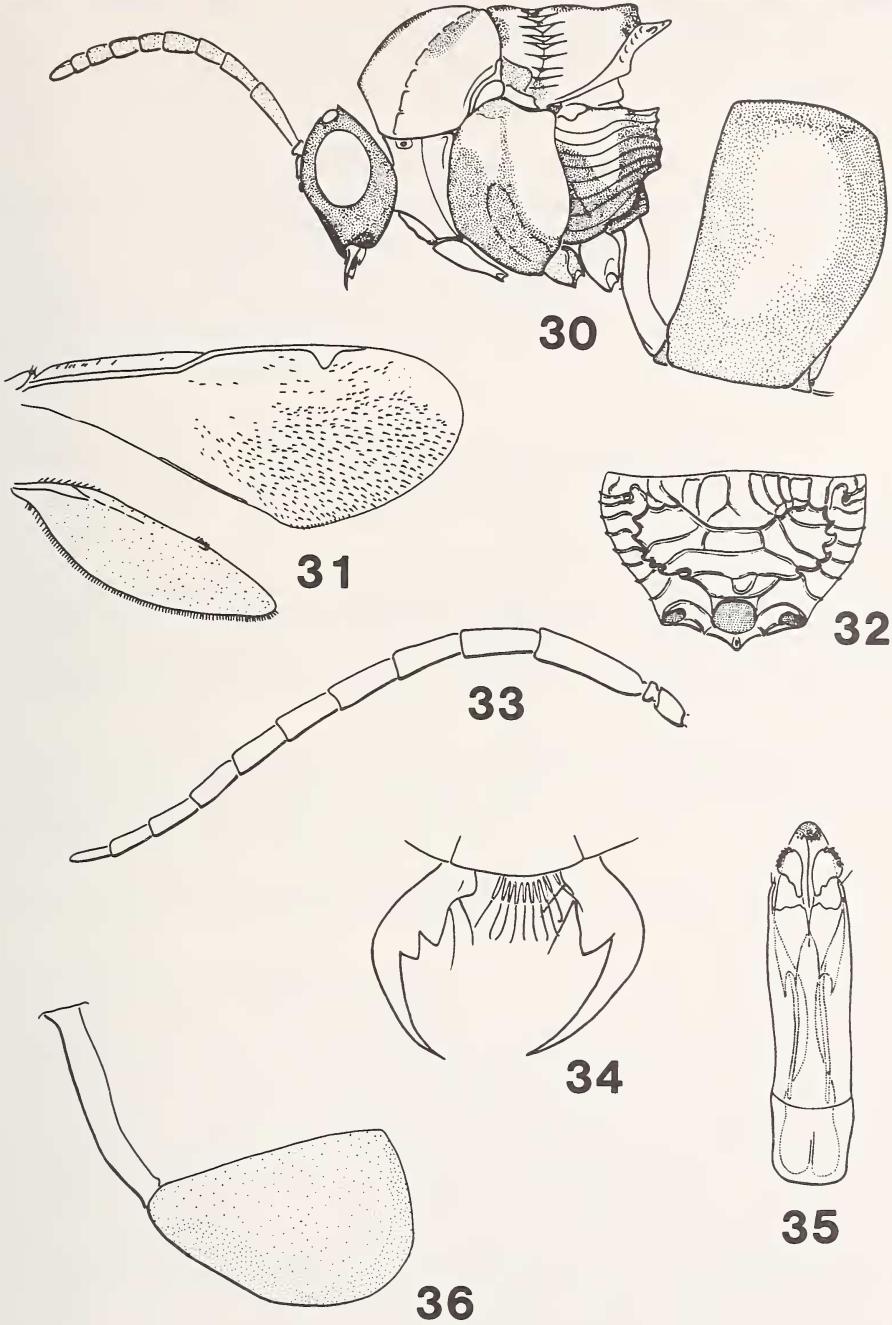
Distribution. Neotropical, and Nearctic in southwestern U.S.A. and Florida.

Remarks. The following Neotropical species are included in the genus *Obeza*:

grenadensis (Howard 1896: 133, *Stilbula*); **n. comb.**, Grenada, W.I. [type examined].

maculata (Westwood 1874: 153, *Schizaspidia*); *maculata* (Westwood), Kirby 1886: 29, *Orasema*; **n. comb.**, Brazil [from original description and figure].

meridionalis (Kirby 1889: 144, *Tetramelia*); **n. comb.**, Brazil [pers. comm. Z. Bouček (BMNH)].



FIGS. 30-36. *Obeza floridana*: 30, habitus (areolate sculpture of mesosoma not figured), ♀; 31, wings, ♀; 32, propodeum in posterior view, ♀; 33, male antenna; 34, lower face in frontal view; 35, male genitalia in ventral view; 36, male metasoma in lateral view.

nigromaculata (Cameron 1884: 104, *Lophyrocera*); **n. comb.**, Nicaragua [from original description and figure].

semifumipennis (Girault 1911: 392, *Stilbula*); **n. comb.**, Paraguay [from original description].

KEY TO THE NORTH AMERICAN SPECIES OF *OBEZA* N. GEN.

1. Female antenna 11-segmented, male antenna 12-segmented; head black; ventral setae of forewing long; overall orange-red colouration in both females and males
 *Obeza floridana* (Ashmead)
- Female antenna 12-segmented, male antenna 12-segmented; head cyaneous or black; ventral surface of wing with microtrichia; testaceous colouration with either restricted or extensive black patterning in female; almost completely black mesosoma in male
 *Obeza septentrionalis* (Brues)

Obeza floridana (Ashmead) new combination

Figs. 30-36, 58, 64, 68, 69, 74.

Lophyrocera floridana Ashmead, 1888: 187; Ashmead 1892: 357.

Stilbula floridana; Gahan 1940: 435-6.

Female. Length 3.4-4.8 mm. Head black; mesosoma light testaceous to darker orange-brown, dark brown to black patterned markings dorsally and laterally (Fig. 30); antenna dark brown, scape and pedicel testaceous; apex of antenna light brown. First gastral tergite orange-testaceous to dark brown, testaceous laterally, following segments testaceous and dark brown posteriorly. Coxae range from partially to wholly testaceous. Petiole and legs testaceous. Wings infuscate to hyaline.

Head 1.5-1.6 times broader than high. POL 2.6-3.4 times LOL, POL 1.4-1.8 times OOL. Face with prominent striae (Fig. 64), continuous across clypeus and supraclypeal area, carina between posterior and anterior ocellus continued laterally onto frons, crenulate between posterior ocelli; occipital carina extending to eye margin; malar depression and scrobe smooth. Eyes separated by 1.8-2.1 times their height. Malar space 0.7-0.9 times height of eye; malar depression deeply impressed, equal to half malar space. Labrum 10 to 11-digitate (Fig. 34). Antenna 11-segmented (Fig. 30); first flagellomere 4.0 times as long as apical width, following flagellomeres 2.0 times longer than broad, becoming quadrate apically; sensilla comprised of fine and thick setae.

Mesosoma robust; mesoscutum, prepectus and mesepimeron areolate-rugose; axilla and scutellum areolate-rugose (Fig. 58) to longitudinally carinate; sparse short setae on mid-lobe of mesoscutum and apex of scutellum; dense, long setae on callus and propodeal process. Mesoscutum 1.9-2.1 times broader than long dorsally. Scutellum wider than long, with only a slight median depression; frenal spines 0.2 times length of scutellum. Disc of propodeum vertical; few transverse carinae across disc, longitudinally carinate laterally; lateral processes strongly carinate apically. Femoral groove poorly defined. Proepisternum areolate-rugose. Coxae smooth, metacoxa globose. Legs slender, femora glabrous except dorsal row of short setae; tibiae with sparse erect long setae, tarsi dense setose. Forewing 2.5-3.0 times as long as broad; costal cell 0.3-0.4 times as long as wing, single row of ventral setae; submarginal vein dorsally with few erect setae; basal area of wing and area below marginal vein bare; rest of wing disc with dense long ventral setae, bare dorsally; veins distinct, stigma prominent, twice as long as broad; postmarginal vein slightly longer than stigma. Hindwing 3.2-3.8 times as long as broad.

Petiole 2.9-3.8 times as long as broad, 2.1-3.0 times longer than metacoxa, flattened dorsally, bare with weak irregular longitudinal carinae laterally and ventrally. Gaster 1.1-1.5 times longer than high, smooth.

Male. Length 3.4-5.3 mm. Slightly darker than female. Antenna 12-segmented,

longer than female (Fig. 33); first flagellomere 4.0 times as long as broad, following flagellomeres more than 3.0 times as long as broad. Propodeal processes prominent, rounded apically (Fig. 68). Petiole 4.5-6.5 times as long as broad, glabrous, cylindrical.

Type Material Examined. *Holotype* of *Lophyrocera floridana* Ashmead (♂) is "type 41192" (USNM) labelled "Jacksonville, Fla, Type *Lophyrocera floridana* Ashmead" [captured in April, from original description].

Other Material Examined. 14 ♀♀ 33 ♂♂. **Florida:** ♀ Clearwater, April 30, 1908, Van Duzee (MCZ); ♀ Orlando, April 29, D.M. DeLong (USNM); ♀ Suwanee Co., July 26 1954, F.W. Mead (FLA); ♀ Alachua Co., Pierces Homestead, May 8 1974, W.H. Pierce, Malaise (FLA); 2 ♀♀ Tampa, May 2 1908 Van Duzee (CAS); ♀ Monroe Co., Big Pine Key, April 4 1972, J.B. Hepner, blacklight (FLA); ♀ Key West, April 1 1903, E.A. Schwarz (USNM); ♀ Torreya State Park, Liberty Co., May 9-17 1968, H.V. Weems, Jr., Malaise (BRI); 2 ♀♀ Ross & Castello Hamm., Dade Co., April 6 1963, H.V. Weems (FLA); ♀ Dade Co., Fuch's Hammock, nr. Homestead, May 23-24 1939, T.S. Dicke & H.V. Weems, Malaise (FLA); ♀ Royal Palm Hammock, Everglades Nat. Pk., December 19 1940, G.S. Walley (BRI); ♀ Cape Sable, February 14 1950, J.S. Caldwell (USNM); ♂ Key Largo, March 26 1954, K.V. Krombein (USNM); 3 ♂♂ Waldo, August 18 1930, R.H. Beamer (USNM); ♂ N of Picnic, September 8 1938, Onan (USNM); ♂ Paradise Key, April 5, J.N. Knull (USNM); ♀ Ft. George, Type[?], [not mentioned in original description] (USNM); ♂ Indian River (USNM); ♂ Alachua Co., August 27 1955, R.A. Morse, sweeping weeds (FLA); 2 ♂♂ Monroe Co., Big Pine Key, December 1970, W.H. Pierce, sweeping grass (LACM); ♂ Dade Co., Miami Plant Intro. Lab., May 1 1974, W.H. Pierce, Malaise (FLA); ♂ Sanford, August 8 1939, R.H. Beamer (KAN); 5 ♂♂ Hudson, July 13 1939, R.H. Beamer (USNM, KAN); ♂ Hilliard, August 19 1930, R.H. Beamer (KAN); ♂ Clearwater, May 1 1908, Van Duzee (MCZ); 2 ♂♂ Archbold Bio. St., Lk. Placid, May 6 1961, H.E. & M.A. Evans (MCZ); ♂ Hudson, July 13 1939, Oman (USNM); ♂ Tampa, April 29 (USNM); 2 ♂♂ Tampa, May 2 1908, Van Duzee (CAS); ♂ Tampa, April 13[?]; ♂ Sanford, April 30 1908, Van Duzee (MCZ); ♂ Levy Co., Cedar Key, May 18 1970, D.L. Bailey, Malaise (USNM); ♂ Stock Island, Monroe Co., October 15 1963, H.V. Weems, Jr. (FLA); ♂ Brevard Co., Eau Gallie Beach 101, August 8 1938, Hubbell-Friauf (MMZ); ♂ Budnell, August 19 1942 (USNM). **Georgia:** ♂ Seminole Co., Lake Seminole, Henry Cummings Landing, August 23 1975, C.L. Smith (GEO).

Remarks. Easily distinguished from *O. septentrionalis* by its generally smaller size, 11-segmented antenna in females, black head, long ventral setae on forewings and overall orange-red colouration in both females and males.

Distribution. Florida and southern Georgia. Fig. 74.

Obeza septentrionalis (Brues) new combination

Fig. 74.

Schizaspidia septentrionalis Brues, 1907: 104.

Stilbula septentrionalis; Gahan 1940: 435-6.

Female. Length 4.5-6.4 mm. Head black with faint to strong metallic green reflections; mesosoma testaceous with dark brown to black patterned markings dorsally and laterally; antenna dark brown; scape and pedicel testaceous, apical flagellomeres and rarely base of first flagellomere light brown. First gastral tergite dark brown, testaceous laterally, following segments testaceous, dark brown posteriorly and dorsally. Coxae range from partially to wholly testaceous. Petiole and legs testaceous. Wings infusate or hyaline.

Head 1.6-1.7 times broader than high. POL 2.9-3.8 times LOL, POL 1.3-1.7 times OOL. Face with prominent striae, continuous across clypeus and supraclypeal area, without definite carina between posterior and anterior ocellus, crenulate between posterior ocelli; occipital carina extending weakly past posterior ocelli; scrobe and malar depression smooth. Eyes separated by 1.8-2.0 times their height. Malar space 0.7-0.9 times height of eye; malar depression deeply impressed, equal to half malar space. Labrum 9 to 15-digitate. Antenna 12-segmented; first flagellomere 5.0 times as long as apical width, following flagellomeres 3.0 times as long as broad, becoming subquadrate apically; sensilla comprised of dense, fine and thick setae.

Mesosoma robust; prepectus, mesepimeron and dorsum areolate, sparsely covered

with short setae; callus and propodeal processes with dense, long setae. Mesoscutum 1.8-2.1 times broader than long dorsally. Scutellum wider than long, with shallow median longitudinal depression; frenal spines 0.1-0.2 times length of scutellum. Disc of propodeum vertical, deep-rugose, few transverse carinae across disc; longitudinally reticulate laterally, lateral processes rounded. Femoral groove poorly defined. Proepisternum areolate-rugose. Coxae smooth, metacoxa subglobose, about 1.5 times as long as broad. Legs slender, femora glabrous except dorsal row of short setae; tibiae with sparse erect long setae, tarsi densely setose. Forewing 2.7-4.0 times as long as broad; costal cell 0.4 times as long as wing, with scattered ventral setae; submarginal vein dorsally with few erect setae; basal area of wing and area below marginal vein bare; rest of wing disc with dense microtrichia ventrally, bare dorsally; veins distinct, stigma prominent, twice as long as broad; postmarginal vein longer than stigma. Hindwing 3.5-4.3 times as long as broad.

Petiole 1.8-4.2 times as long as broad, 1.4-3.0 times as long as metacoxa, stout, flattened dorsally, bare with weak (or robust) carinae laterally and ventrally. Gaster 1.2-1.5 times as long as high, smooth.

Male. Length 6.3 mm. Head cyaneous; mesosoma patterned with dark brown and black, no testaceous areas; antenna, legs, petiole light testaceous; gaster dark brown to black. Antenna 12-segmented, longer than in female, first flagellomere 6.0 times as long as wide, apical segment 4.3 times as long as wide. Propodeal processes prominent, broadly rounded. Petiole 7.2 times as long as broad, 7.6 times as long as metacoxa; cylindrical, with few weak carinae. Gaster smaller than female.

Type Material Examined. *Holotype* of *Schizaspidia septentrionalis* Brues (♀) is "type 42707" (USNM) labelled "Huach Mts, VI, Ariz, TYPE, Catal. No. 357, Collection Brooklyn Museum".

Other Material Examined. 20 ♀♀ 1 ♂. **Arizona:** 3 ♀♀ Post Creek Cn., Pinaleno Mtns., Fort Grant, July 15-18 1917 (MCZ); ♀ Huachuca Mtns., June 9 1935, J.N. Knull (USNM); ♀ "Ariz.", [Ashmead determination as] *Lophyrocera nigromaculata* Cameron (ANSP); ♀ 5 mi W Portal, Cochise Co., June 17 1959, L.A. Stange (DAV); ♀ S.W. Res. Stn., Portal, June 19 1956, H. & A. Howden (BRI); ♀ Garcia, August, N. Banes (USNM); ♀ Garcia (USNM); ♀ Santa Rita Mts., 4500', June 27 1968, A.A. Nichol (USNM); ♂ Prescott, June 8 1941, D.J. & J.N. Knull (USNM). **New Mexico:** ♀ Otero Co., 4 mi NE La Luz, June 25 1964, D.R. Smith & C.W. Baker (USNM); ♀ Cloudcroft, June 27 1940, R.H. Beamer (KAN). **Texas:** 5 ♀♀ Limpia Canyon, Davis Mts., June 17-20 1961, R.L. Westcott (LACM); ♀ Davis Mtns., July 2 1940, D.J. & J.N. Knull (USNM). **MEXICO:** **Chiapas** ♀ Santa Clara, Namiquipa Dist., 6500', July 3 1947, D. Rockefeller (AMNH).

Remarks. Distinguished from *O. floridana* by 12-segmented antenna present in females (apical flagellomeres may be fused but suture evident), usually cyaneous colouration of the head, microtrichia on ventral surface of wing, testaceous colouration of females and almost black mesosoma of males.

Variation. The colour of the body varies from restricted patterns to almost wholly black, and of the head from a strong metallic colouration to black. There is no correlation between the two.

Distribution. Arizona, New Mexico, Texas and Mexico. Fig. 74.

Lophyrocera Cameron

Lophyrocera Cameron, 1884: 103.

Type-species. *Lophyrocera stramineipes* Cameron, 1884: 103 [type by original designation].

The almost total fusion of the genae posterior to the mandibles, reduction of mouthparts, mesocoxal carina and single metatibial spur provide evidence of a close sister group relationship between *Lophyrocera* and *Pseudochalcura*. The generic diagnosis does not distinguish *Lophyrocera* from *Tetramelia*, a genus restricted to the Neotropical region. There is a lack of good characters which can be used to separate the two genera. The

previous character used for separation was the direction of the propodeal processes (downward or horizontal) which does not hold true for all of the species. The males of *Tetramelia* have a more elongate and angulated gaster but this is not a valuable character for defining generic limits. The species within these two genera are morphologically diverse but, unfortunately, poorly collected. A proper treatment of a potential synonymy of these two genera will require a more comprehensive review of the Neotropical species. From the Neotropical material examined, there are several undescribed species in this genus additional to the two species now recognized.

Generic Diagnosis. Head transverse, as broad as mesosoma. Median ocellus only slightly anterior to posterior ocelli; occipital carina present; temple behind eye narrow; occiput vertical behind eye, flat. Antennal scrobe narrow, as deep as width of scape. Genae not completely fused behind mandibles, forming a sharply angulated ridge, angle between ventral and posterior faces about 90° (Fig. 70). Clypeus slightly wider than long, shorter than supraclypeal area, base of clypeus without groove, deeply impressed laterally. Mandibles falcate, apical tooth wider than width of clypeus. Mouthparts reduced, usually visible externally. Scape long, not reaching median ocellus; antenna stout, without basal anellus, flagellomeres lobate in female, rarely serrate, flagellum shorter than width of head; each flagellomere of male with long flattened ramus, only slightly decreasing in length apically.

Mesosoma globose; notaulices joining at posterior margin. Axillae broadly fused medially, on same plane as mesoscutum dorsally, joined posteriorly to scutellum across crenulate to punctuate furrow. Scutellum broadly rounded, narrower than mesoscutum, usually produced apically into blunt process; frenum produced into two narrow apical processes. Disc of propodeum flattened; propodeal processes blunt or pointed; callus slightly bulging, with several short erect setae; metepisternum not distinct. Femoral groove broadly impressed. Prepectus fused to pronotum, without distinct suture or furrow, not reaching tegula; spiracle recessed into pronotum dorsally and broadly enclosed dorsally. Anterior margin of metasternum slightly produced between mesocoxae. Procoxa elongate, meso- and metacoxae globose, mesocoxa usually with lateral carina. One metatibial spur. Marginal vein of forewing distinct, vaguely discernible in hindwing.

Petiole stout, at least twice length of metacoxa. Gaster globose, first tergite covering following segments. Ovipositor acicular.

Distribution. Neotropical and Nearctic (western states).

Lophyrocera apicalis Ashmead

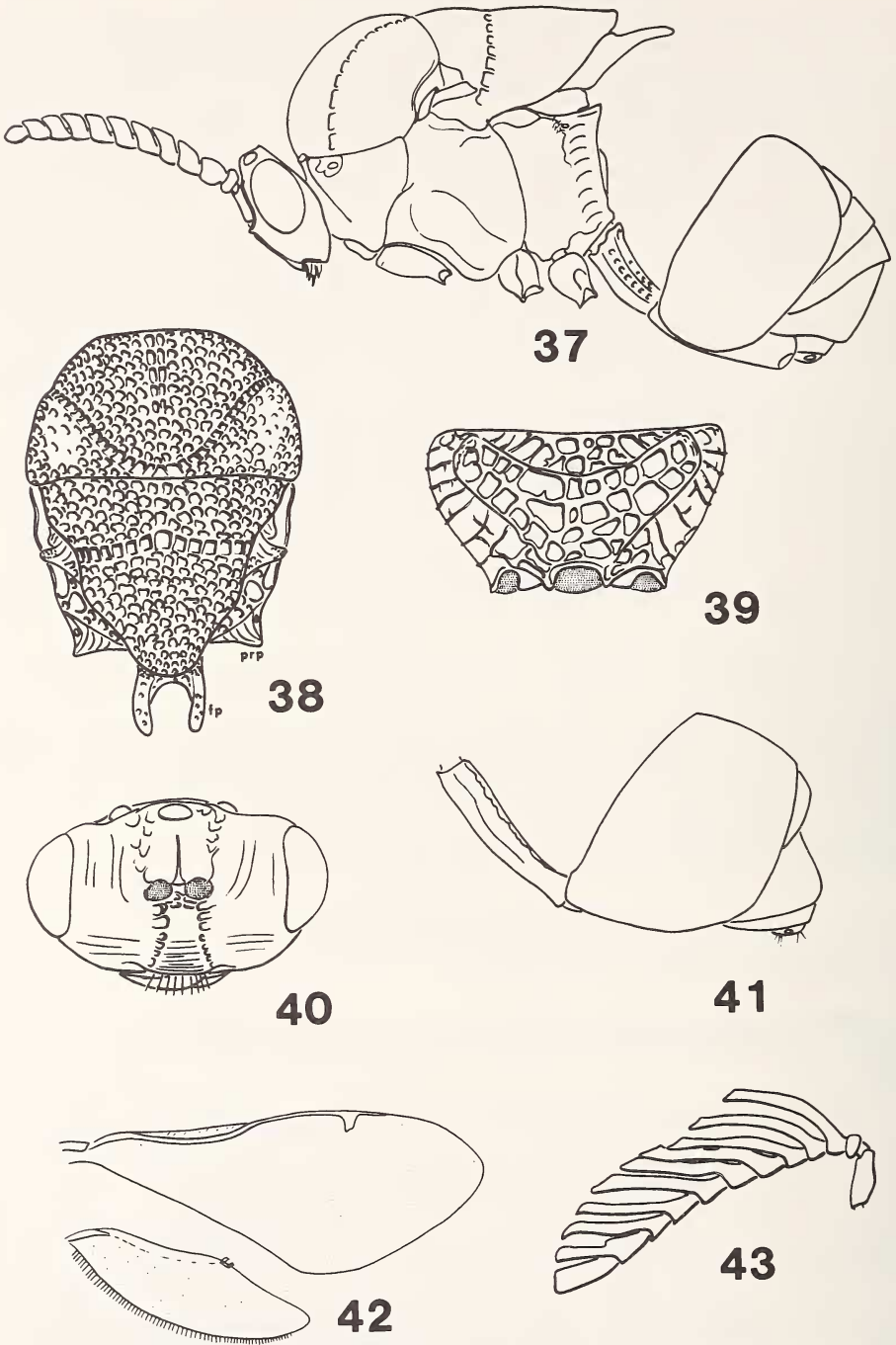
Figs. 37-43, 74.

Lophyrocera apicalis Ashmead, 1892: 357.

Female. Length 4.3-5.0 mm. Black; scape, pedicel, coxae, gaster and basal half of femora brown; apical two flagellomeres of antenna and rest of legs testaceous. Wings hyaline.

Head 1.7-1.8 times broader than high (Fig. 40). POL 2.7-3.2 times LOL, POL 1.6-2.0 times OOL. Frons and face with weak striae, scrobe rugose, finely striate across clypeus, supraclypeal area bare; carina between posterior and anterior ocelli continued laterally on frons, occipital carinae present. Eyes separated by 2.1-2.2 times their height. Malar space 0.8-0.9 times height of eye; malar depression shallow, less than half malar space. Labrum 7 to 9-digitate. Antenna 12-segmented (Fig. 37), flagellomeres equal in length, apical two flagellomeres sometimes fused; sensilla comprised of short dense appressed setae.

Mesosoma robust, areolate-rugose to coarsely punctate, side-lobes bare, sometimes smooth dorsally. Mesoscutum 1.7-2.3 times broader than long dorsally. Axilla and scutellum with shallow median longitudinal depression; frenal spines 0.3 times length of scutellum. Disc of propodeum vertical, propodeal processes sharp (Figs. 37, 38). Proepisternum areolate-rugose. Coxae smooth. Legs slender; femora smooth, with scattered short setae; dense appressed setae on tibiae and tarsi. Forewing 2.1-2.5 times as long as broad



FIGS. 37-43. *Lophyrocera apicalis*: 37, habitus, ♀ ; 38, mesosoma in dorsal view, ♀ ; 39, propodeum in posterior view, ♀ ; 40, head in frontal view, ♀ ; 41, male metasoma, lateral view; 42, wings, ♀ ; 43, male antenna. fp - frenal process, prp - propodeal process.

(Fig. 42); costal cell 0.3-0.4 times length of wing, scattered short ventral setae; submarginal vein dorsally with few short setae; basal area bare, rest of wing disc with very short microtrichia ventrally, bare dorsally; stigma twice longer than broad; postmarginal vein longer than stigma. Hindwing 3.0-3.6 times as long as broad.

Petiole 1.6-3.2 times as long as broad, 1.2-2.3 times longer than metacoxa (Fig. 37); flattened dorsally, areolate dorsally and dorsolaterally, with irregular carinae along dorsal edge; ventrally with fine longitudinal striae. Gaster 1.2-1.7 times as long as high, smooth; apical tergites scattered-micropunctate, with scattered short setae dorsally, first sternite smooth.

Male. Length 4.6-5.0 mm. Slightly darker colour than female. Antenna 12-segmented, flagellomeres dorsoventrally flattened, each dorsally with long, flat, gently curved ramus (Fig. 43). Propodeal processes longer than in female, extending as far as apex of frenal spines, with several short setae along dorsal edge. Disc of propodeum gently curved between processes. Petiole 8.0-9.0 times longer than broad, 2.7-3.0 times as long as metacoxa, sculpture as in female (Fig. 41).

Type Material Examined. *Holotype* of *Lophyrocera apicalis* Ashmead (♀) is "type 2141" (USNM) labelled "Santa Cruz Mts., Cal".

Other Material Examined. ♀♀ 2 ♂♂. **Arizona:** ♂ Williams, July 13 1929, E.D. Ball (USNM). **California:** ♀ Cajon Ps., June 26 1941, D.J. & J.N. Knull (USNM); ♀ ♂ San Antonio Valley, Mount Hamilton, June 26 1975, J.B. Johnson (IDA); ♀ Kelseyville, Lake Co., June 20 1959, S.M. Fidel (DAV); ♀ Camp Baldy, Los Angeles Co., June 26 1950, J.C. Hall (DAV); ♀ Burney, Shasta Co., July 8 1946, P.D. Hurd & R.F. Smith, *Eriogonum* (BER). **Colorado:** ♀ Poudre Canyon, June 9 1934, K. Maehler (COL). **South Dakota:** ♀ 2 mi S Blue Bell Custer St. Pk., June 10 1961, H. & A. Howden (BRI). **Texas:** ♀ Brewster Co., Big Bend Nat'l Park, 12.5 mi SE Panther Jct., 2500', June 23-26 1982, G. Gibson (GUE). **Washington:** ♀ ♂ 22 mi N Goldendale, Klickitat Co., June 26 1969, R.L. Westcott (IDA).

Variation. The single male from Arizona differs from the rest of the specimens in having a 12-digitate labrum with the digits small and close together. All of the other specimens have a 6 to 8-digitate labrum with long, widely spaced digits. No other characters distinguish the male and since the latter type of labrum surrounds the Arizona location (Texas and California), it is interpreted as an aberration.

Distribution. Western United States of America. Fig. 74.

***Pseudochalcura* Ashmead**
Figs. 44-46.

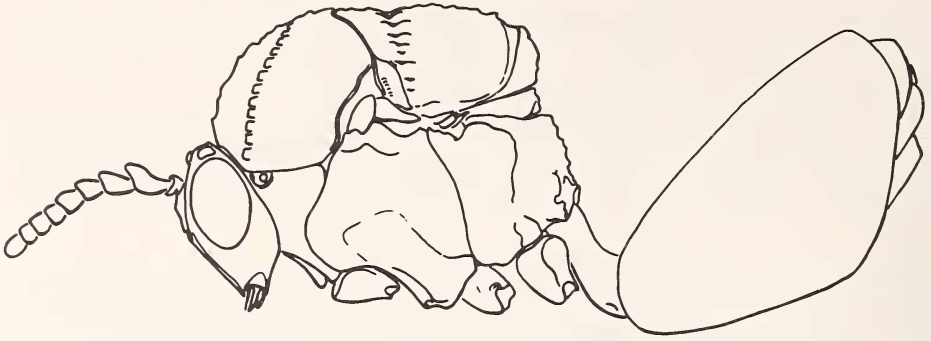
Type-species. *Eucharis gibbosa* Provancher, 1881: 292 [type by original designation].

Revision. Heraty (in press).

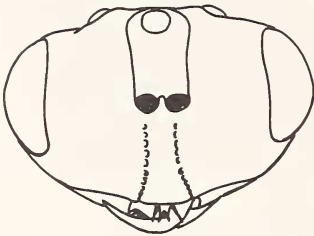
Remarks. *Pseudochalcura* can be distinguished from all other eucharitids by the genal bridge being completely fused behind the mandibles. Relationships are discussed in Heraty (in press) and suggest close relationships with *Obeza* and *Lophyrocera*, with *Pseudochalcura* being the more apomorphic of the three. Four species are found in North America: *P. gibbosa* is widespread in the north throughout Canada and Alaska, west in the Sierra-Cascades and Rocky Mountains, and occurs sporadically in the southwestern states; *P. americana*, *P. liburna* and *P. sculpturata* are restricted to southern Florida.

KEY TO THE NORTH AMERICAN SPECIES OF
PSEUDOCHALCURA ASHMEAD

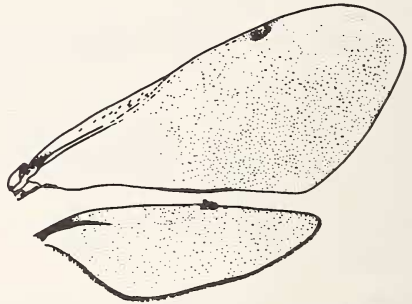
- 1. Dorsal setae on submarginal vein absent, setae of forewing disc extremely short (microtrichia), barely visible; lateral carina of mesocoxa reduced or absent; first gastral sternite of female longitudinally striate 2
- Dorsal setae on submarginal vein present, setae of forewing disc short or long; lateral carina of mesocoxa present; first gastral sternite of female smooth 3



44



45



46

FIGS. 44-46. *Pseudochalcura gibbosa*, ♀ :44, habitus; 45, head in frontal view; 46, wings.

- 2. Metatibial spur present; antenna of female lobate or serrate, antenna of male with 4 basal rami; petiole of female pinched ventroapically; mesosoma completely dark brown or black in female *P. gibbosa* (Prov.)
- Metatibial spur absent; antenna of female strongly lobate or ramose basally, antenna of male with 7 basal rami; petiole of female not pinched ventroapically; mesosoma patterned black or brown and testaceous in female *P. sculpturata* Heraty
- 3. Disc of propodeum with fairly dense, long setae; forewing disc with long setae; usually with infuscate spot below stigma; metafemur bare laterally *P. americana* (Howard)
- Disc of propodeum bare or with few isolated setae; forewing disc with microtrichia in female, longer in male; forewing hyaline; metafemur with long erect setae laterally *P. liburna* Heraty

Acknowledgements

I would like to thank all of the curators of various museums who have generously loaned the material for this study. The Ministry of Natural Resources, Ontario Provincial

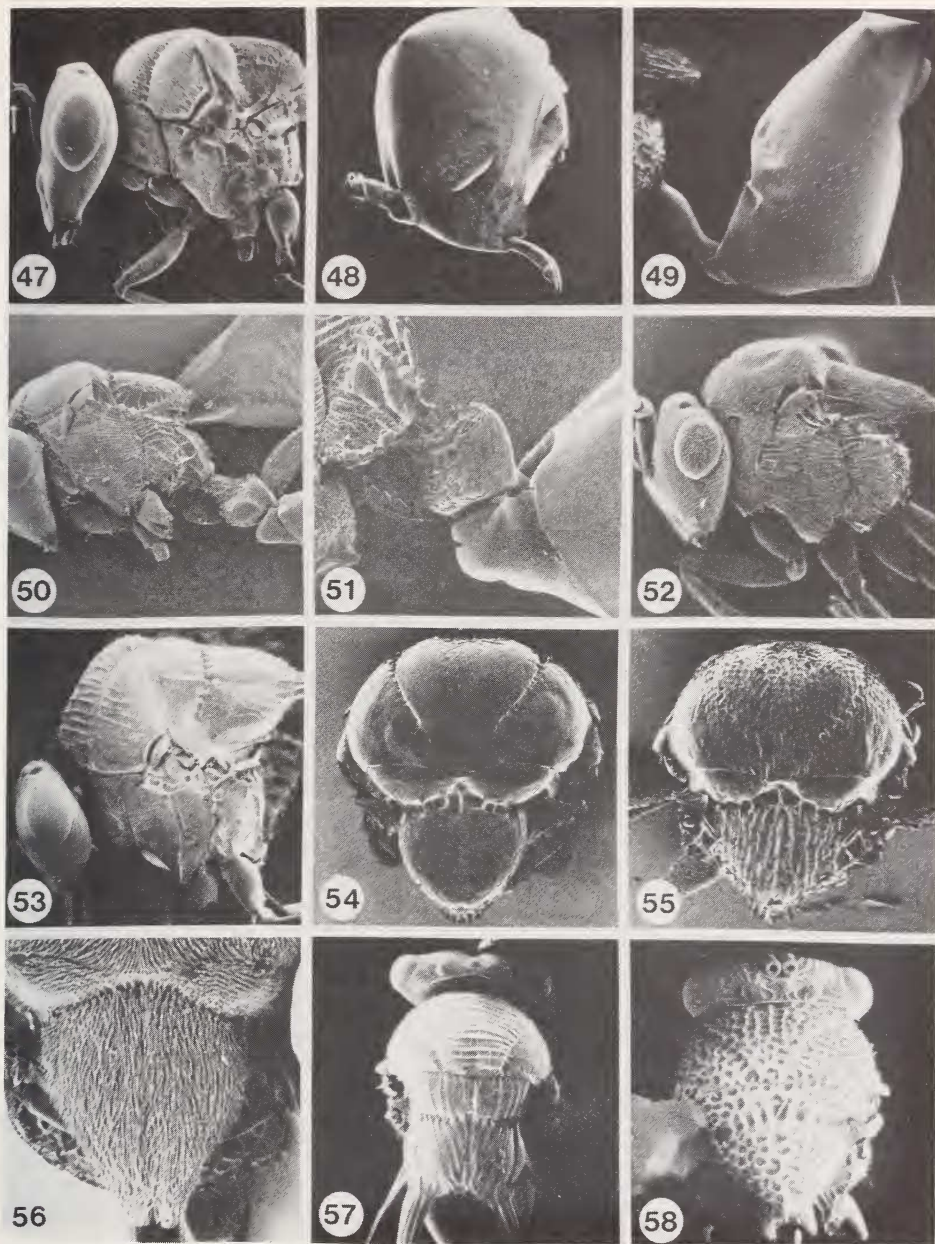
Government, allowed me to carry out extensive collecting at Ojibway Prairie Reserve, Windsor, Ontario and Pinery Provincial Park near Grand Bend, Ontario. Dr. S.A. Marshall and Mr. K.N. Barber and Dr. Z. Bouček (Commonwealth Institute of Entomology, London) have made well appreciated comments on this manuscript. Finally, I would like to extend my thanks to Dr. "D.H." Pengelly for helping to provide the initial enthusiasm which has carried on throughout the course of this study.

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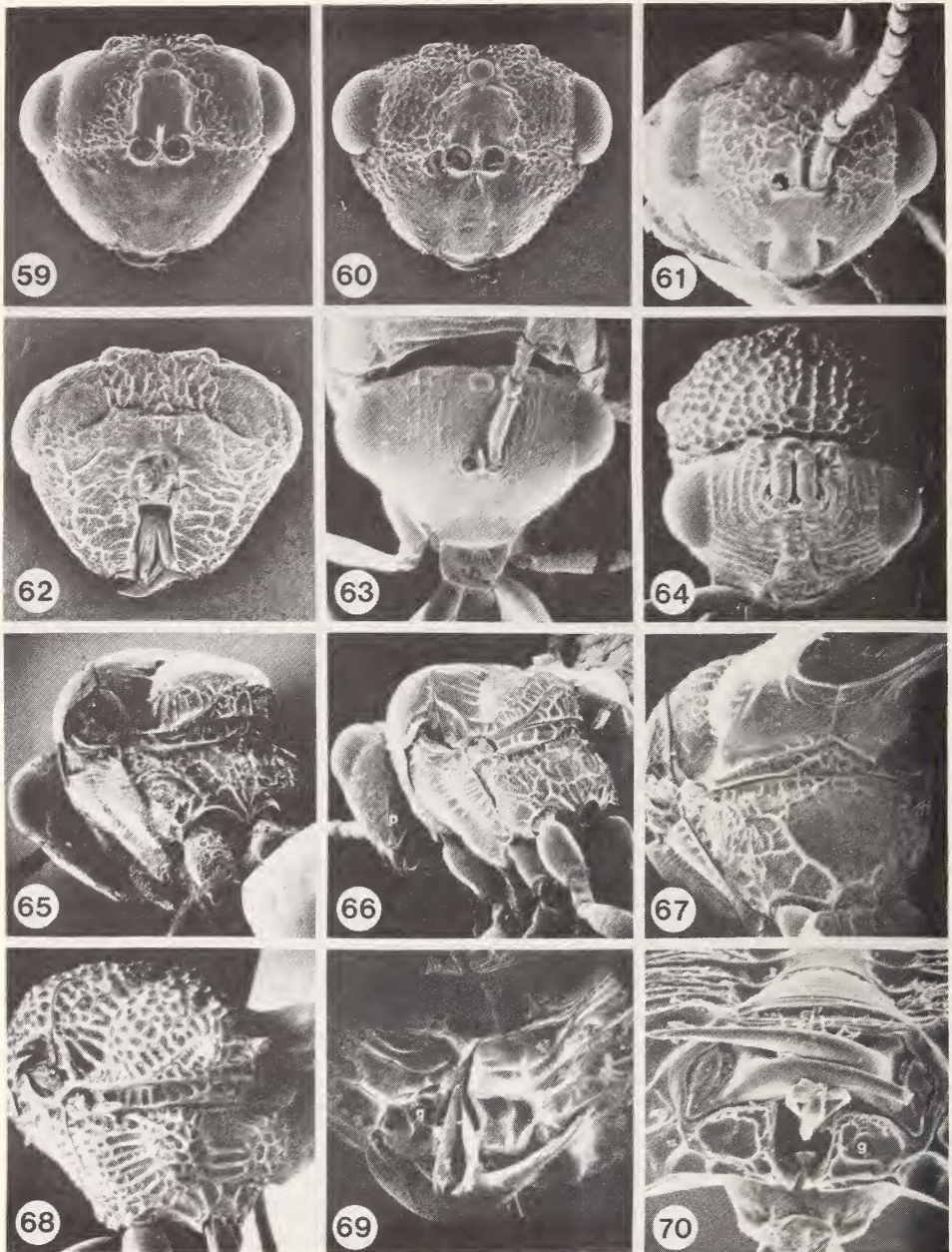
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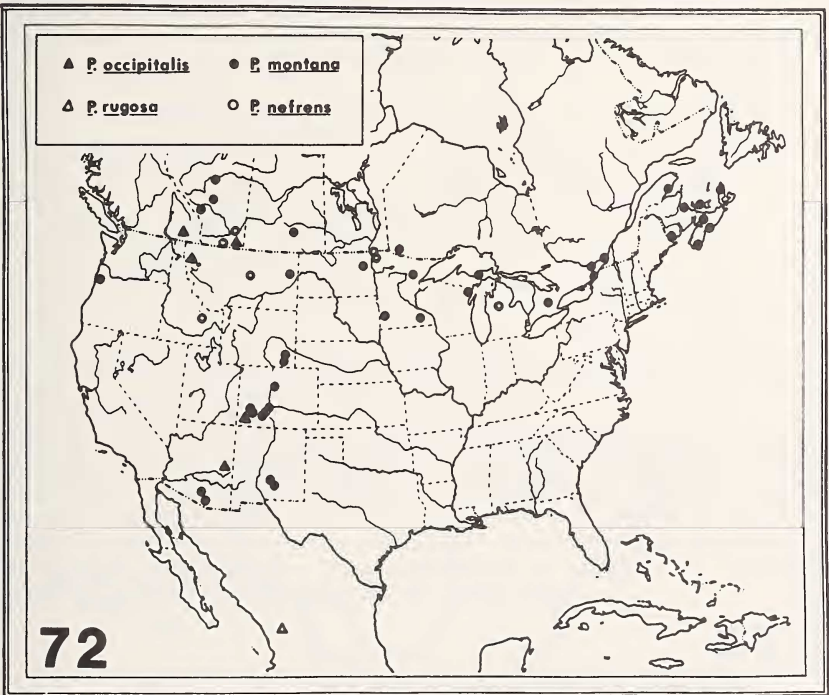
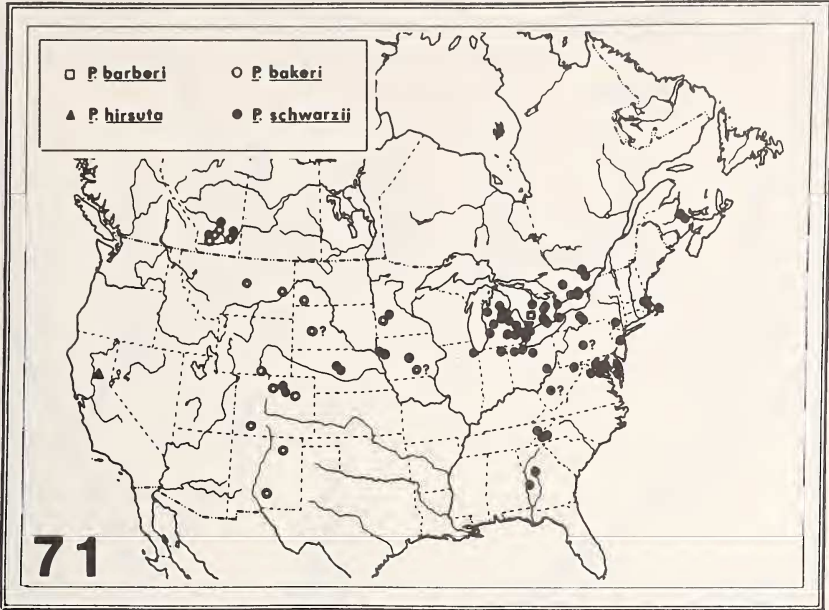
(Received 7 March 1985; accepted 27 May 1985)



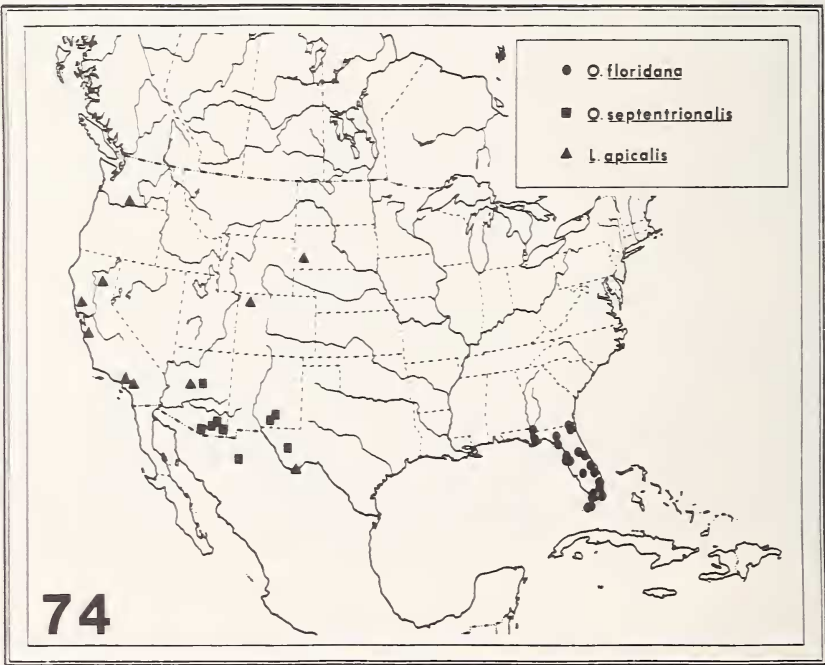
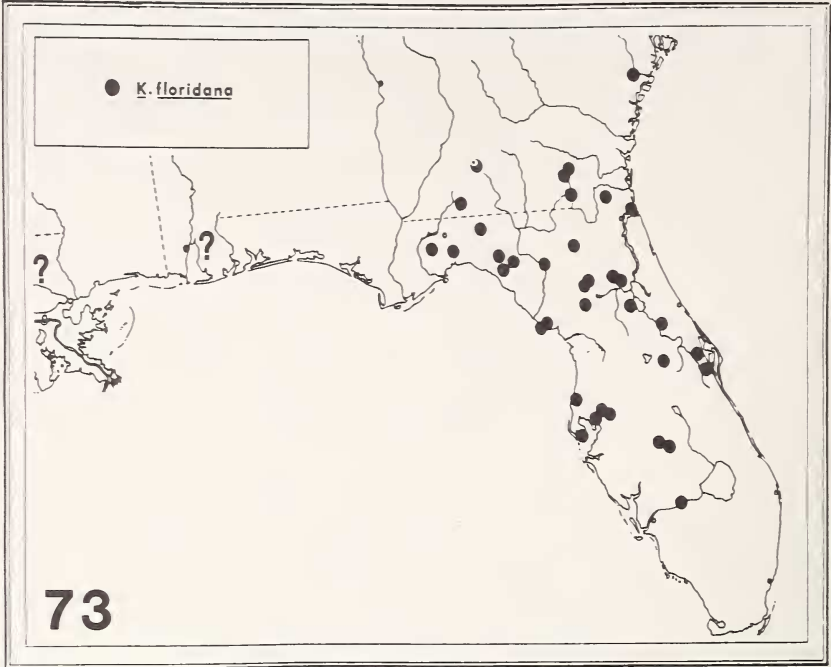
FIGS. 47-58. 47-48, *Orasema* sp. nr. *cockerelli* Gahan, ♀ : 47, mesosoma, arrow points to anellus; 48, metasoma. 49, *Pseudometagea montana*, metasoma, ♀ . 50-51, *Pseudometagea schwarzii*: 50, mesosoma, ♂ ; 51, petiole in lateral view, ♀ . 52, *Pseudometagea montana*, mesosoma, ♀ . 53, *Kapala floridana*, mesosoma, ♀ . 54, *Pseudometagea schwarzii*, mesosoma, ♀ . 55, *Pseudometagea bakeri*, mesosoma, ♀ . 56, *Pseudometagea montana*, scutellum, ♀ . 57, *Kapala floridana*, mesosoma, ♀ . 58, *Obeza floridana*, mesosoma, ♂ .



FIGS. 59-70. 59-61, heads in frontal view: 59, *Pseudometagea schwarzii*, ♀ ; 60, *Pseudometagea bakeri*, ♀ ; 61, *Pseudometagea occipitalis*, ♀ . 62, *Pseudometagea schwarzii*, posterior view of head, arrow points to the postoccipital carina, ♀ . 63-64, heads in frontal view: 63, *Kapala floridana*, ♀ ; 64, *Obeza floridana*, ♂ . 65-68, postero-lateral view of mesosoma: 65, *Pseudometagea schwarzii*, ♀ ; 66, *Pseudometagea occipitalis*, ♀ ; 67, *Kapala floridana*, ♀ ; 68, *Obeza floridana*, ♂ . 69, *Obeza floridana*, posterior view of genal bridge and reduced mouthparts. 70, *Lophyrocera* sp., ventral view of genal bridge enclosing reduced mouthparts. g - genal bridge, p - postgenal carina.



FIGS. 71-72. Distribution maps: 71, species of the *schwarzii*-group of *Pseudometagea*; 72, species of the *occipitalis*- and *montana*-groups of *Pseudometagea*. ? = state record, locality not verified.



FIGS. 73-74. Distribution maps: 73, *Kapala floridana*; 74, species of *Obeza* and *Lophyrocera*. ? = state record, locality not verified.

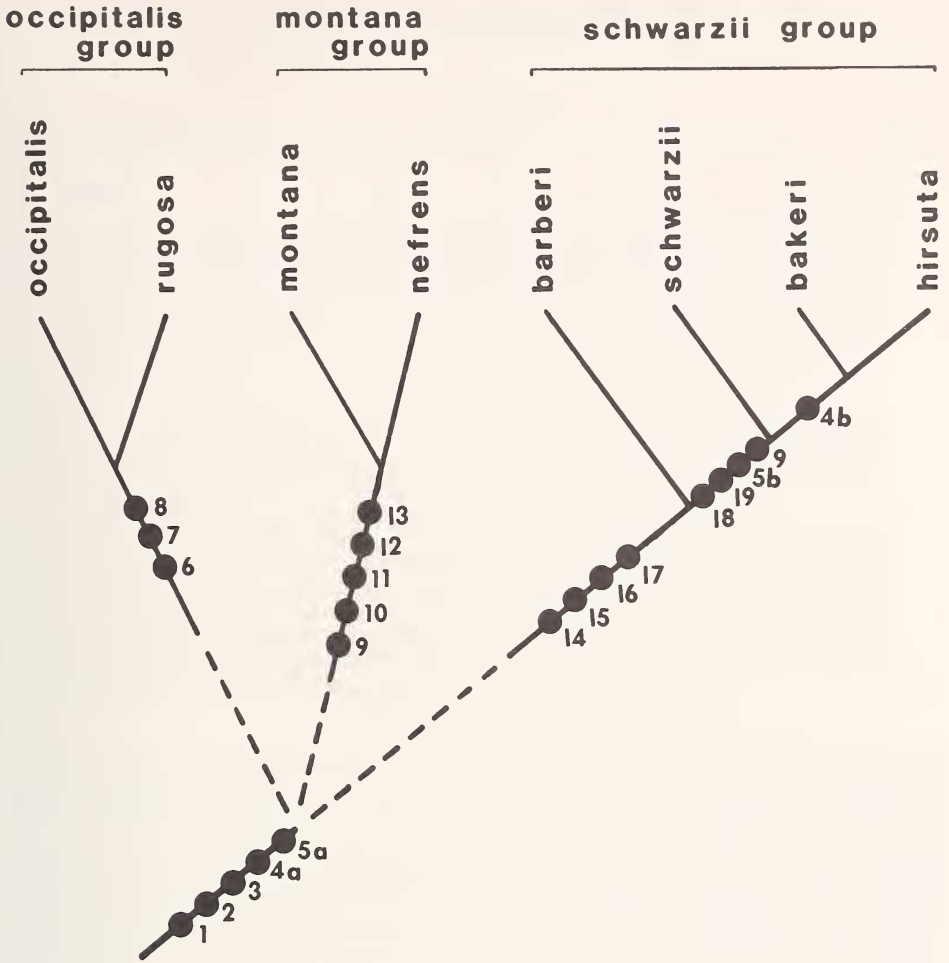


FIG. 75. Cladogram showing proposed relationships among species of *Pseudometagea*.

Apomorphic character states:

- 1 - hindwing broadly rounded apically; 2 - mandibles small; 3 - mesepimeron strigate; 4a - proepisternum glabrous; 4b - proepisternum sculptured; 5a - eye setose; 5b - eye bare; 6 - scrobe rugulose; 7 - male gaster elongate; 8 - medial vein infuscate; 9 - axilla lacking carinae; 10 - postgenal carina lacking; 11 - dorsum pubescent; 12 - coxal sculpture granulate; 13 - hindwing completely fringed; 14 - interocellar area depressed; 15 - first sternite strongly produced; 16 - coxa scabriculous or rugulose; 17 - petiole strongly expanded; 18 - male flagellomeres fewer; 19 - callus ridged.